

IFCB Taxonomy Handbook

Plankton Imaging Lab, University of Maine

Version 2.2
November 2018

This document shows example images of phytoplankton and other non-living particles that have been observed using the IFCB, as visualized by the EcoTaxa software (<http://ecotaxa.obs-vlfr.fr/>).

Images are organized alphabetically by group (at the class level for living particles), and alphabetically by genus within each class.

please send feedback to: Ali Chase, alison.p.chase@gmail.com

Notes:

- Contents are listed by the names shown in EcoTaxa, with common names in parenthesis
- Unidentifiable Diatoms are either classified under centric or pennate shapes
- Unidentifiable Dinoflagellates are classified under “Dinophyceae”
- Chlorophytes includes Prasinophytes
- Rhizaria includes Radiolarians and Foraminifera
- The “othertocheck” category in EcoTaxa is to be used to store interesting images
- use the “dubious” classification on EcoTaxa when an image is suspected to be something but not sure
- currently we sort cells smaller than ~8 microns (24 pixels) to unicellular

Bacillariophyta (Diatoms)

- *Bacteriastrum*
- *Chaetoceros*
- *Corethron*
- *Coscinodiscus*
- *Cylindrotheca*
- *Ditylum*
- *Eucampia*
- *Guinardia*
- *Guinardia delicatula*
- *Hemiaulus*
- *Membraneis*
- *Nanoneis*
- *Nitzschia*
- *Planktoniella*
- *Pseudo-nitzschia*
- *Rhizosolenia*
- *Skeletonema*
- *Thalassionema*
- *Thalassiosira*
- **Centric**
 - Chain
- **Pennate**
 - Chain

Chlorophyta

- *Halosphaera*
- *Pterosperma*
- *Pyramimonas*
- Chlorophyceae (Chlorophytes)

Ciliophora (Ciliates)

- Tintinnida
- Empty

Cladopyxis brachiolata (a dinoflagellate, but separated on EcoTaxa taxonomy list)

Crustacea

Dictyochales

Dinobryon

Dinophyceae (Dinoflagellates)

- *Gyrodinium*
- *Dinophysis*
- *Ceratium*
- *Karenia*
- *Oxytoxum*
- *Prorocentrum*
- *Pyrocystis*
- *Torodinium*
- *Warnowia*

Euglenida

Prymnesiophyceae

- *Phaeocystis*
- Prymnesiaceae
- Rhabdosphaeraceae
- *Scyphosphaera apsteinii*
- **Syracosphaerales**
- *Syracosphaera*
- t002
- t003 (*Ophiaster*)
- t005 (*Acanthoica quattrosipina*)
- t007
- t010 (*Calciopappus caudatus*)

Rhizaria

- Foraminifera

Trichodesmium

Not-living

- **Artefact**
 - Bad Focus
 - Bubble
- **Detritus**

- Fiber
- Feces
- Plastic

Other (Living, Unidentifiable)

- Clumps – homogeneous/uniform
- Multiple – clearly living cells of multiple types in a single image
- Other to Check – place unique and interesting things to check with the group here
- Part – part of living cell (cut off on edge of image)
- Unicellular – ALL images less than 24 pixels

Temporary

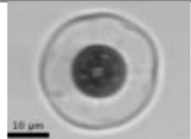
- These categories change – see the shared Google Doc of the temporary categories.

tempCryptophytes

tempflagellates

Major Groups

Chlorophyta

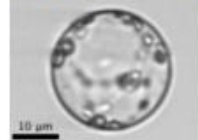


Pterosperma

Pyramimonas



Halosphaera,
Phycoma Stage



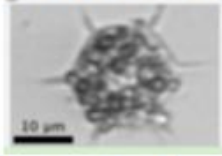
Ciliates



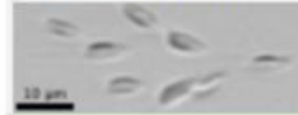
Crustacea



Dictyochales



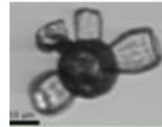
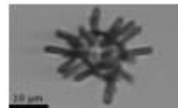
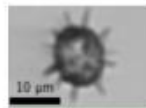
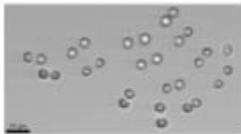
Dinobryon



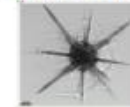
Euglenida



Prymnesiophytes (See Next Chart)



Rhizaria



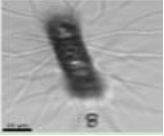

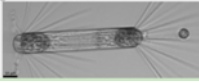
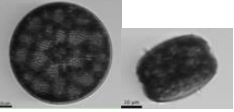




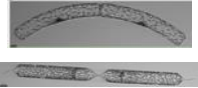


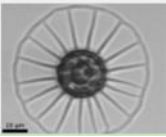


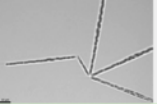

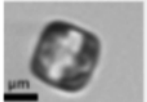


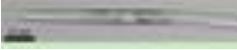
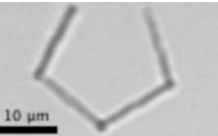
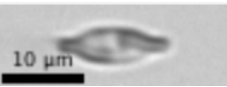

Prymnesiophyceae



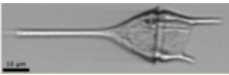


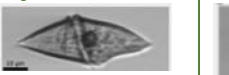

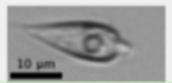

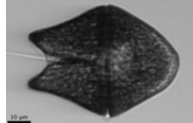
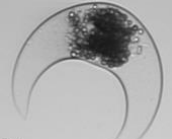


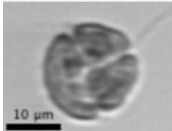
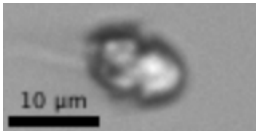
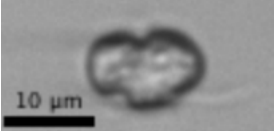
****Be sure that they are round in this category. If they are squarer, they are a centric diatom.****

<p><i>Phaeocystis</i></p>	<p>Prymnesiaceae</p>	<p>Rhabdosphaeraceae</p>		
<p><i>Syracosphaera</i></p>	<p><i>Scyphosphaera apsteinii</i></p>	<p>Syracosphaerales</p>		
<p>t002</p>	<p>t003 (<i>Ophiaster</i>)</p>	<p>t005 (<i>Acanthoica quattrosipina</i>)</p>	<p>t007</p>	<p>t010 (<i>Calciopappus caudatus</i>)</p>


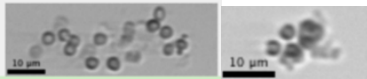
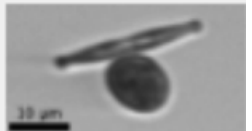
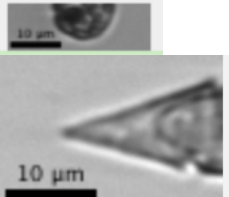
Diatoms

<p><i>Bacteriastrum</i></p> 	<p><i>Chaetoceros</i></p> 	<p><i>Corethron</i></p> 	<p><i>Coscinodiscus</i></p> 	<p><i>Cylindrotheca</i></p> 
<p><i>Ditylum</i></p> 	<p><i>Eucampia</i></p> 	<p><i>Hemiaulus</i></p> 	<p><i>Guinardia</i></p> 	<p><i>Guinardia delicatula</i></p> 
<p><i>Membraneis</i></p> 	<p><i>Planktoniella</i></p> 	<p><i>Pseudo-Nitzschia</i></p> 	<p><i>Rhizosolenia</i></p> 	<p><i>Thalassionema</i></p> 
<p><i>Thalassiosira</i></p> 	<p><i>Centric</i></p> 	<p><i>Centric Chain</i></p> 	<p><i>Pennate</i></p> 	<p><i>Pennate Chain</i></p> 
<p><i>Nanoneis</i></p> 	<p><i>Nitzschia</i></p> 	<p><i>Skeletonema</i></p> 		


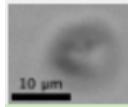


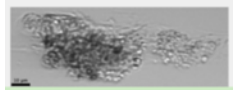



Dinoflagellates

<p><i>Ceratium</i></p> 	<p><i>Warnowia</i></p> 	<p><i>Dinophysis</i></p> 	<p><i>Gyrodinium</i></p> 	<p><i>Karenia</i></p> 
<p><i>Oxytoxum</i></p> 	<p><i>Prorocentrum</i></p> 	<p><i>Akashiwo</i></p> 	<p><i>Pyrocystis</i></p> 	<p><i>Torodinium</i></p> 
<p>Unidentifiable (sort under Dinophyceae)</p>				
				

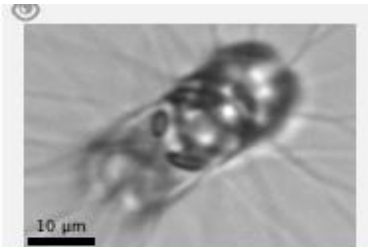
Other - LIVING

<p>Other</p> 	<p>Clumps</p> 
<p>Multiple</p> 	<p>Part</p> 

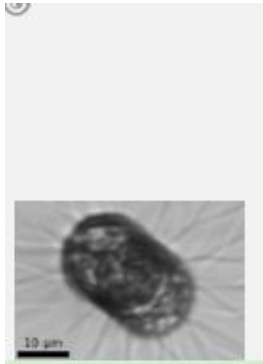
Other - NON-LIVING

Artifact 	Bad Focus 	Bead 
Bubble 	Detritus 	Feces 
Fiber 	Plastic 	

Diatoms - *Bacteriastrum*



Bacteriastrum



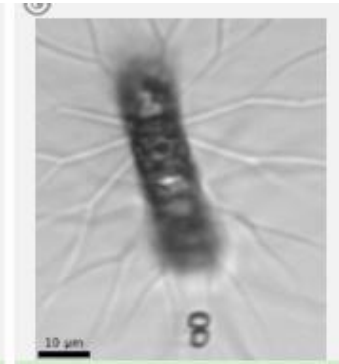
Bacteriastrum



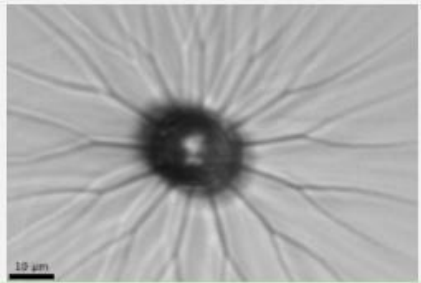
Bacteriastrum



Bacteriastrum

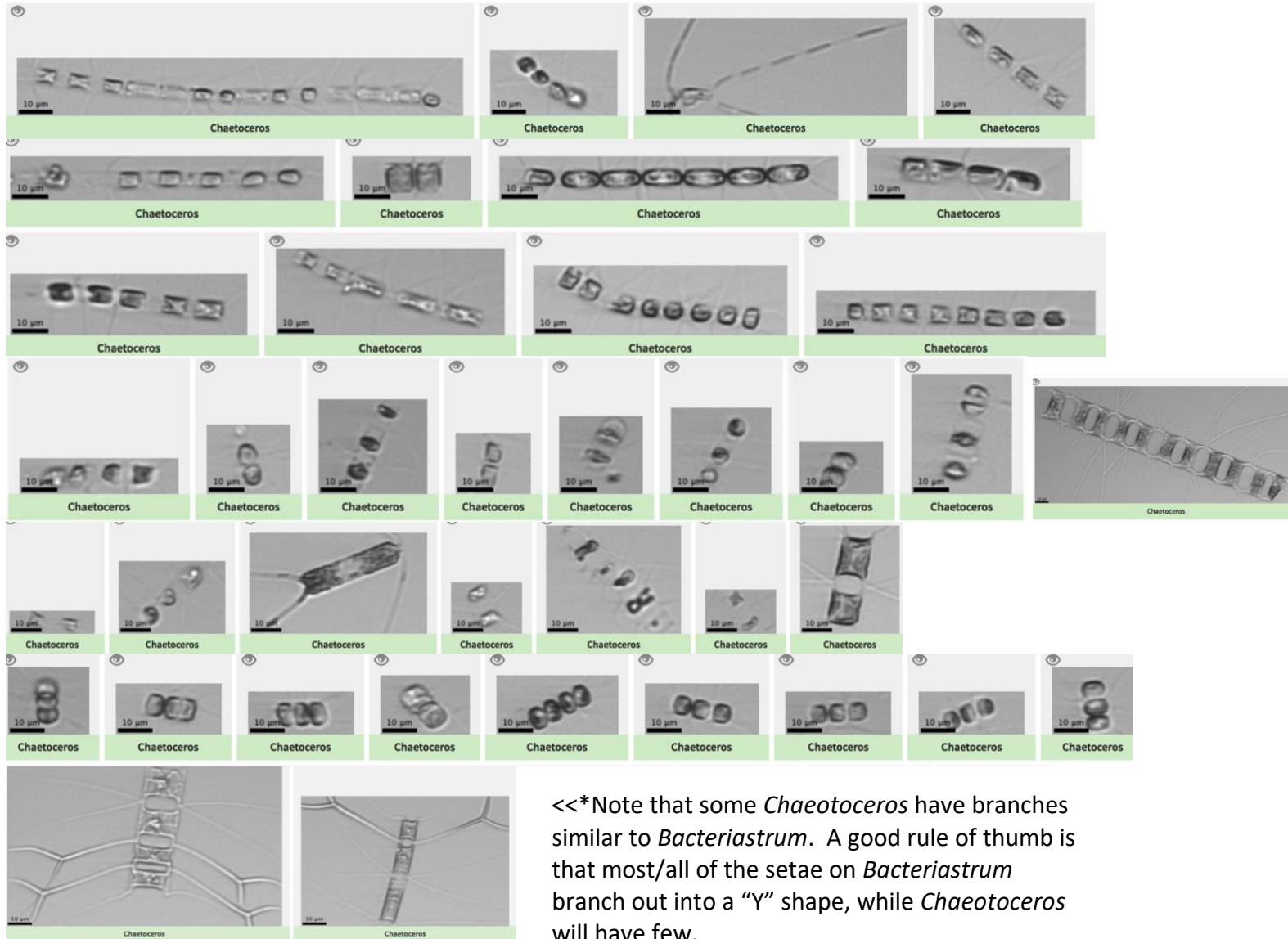


Bacteriastrum



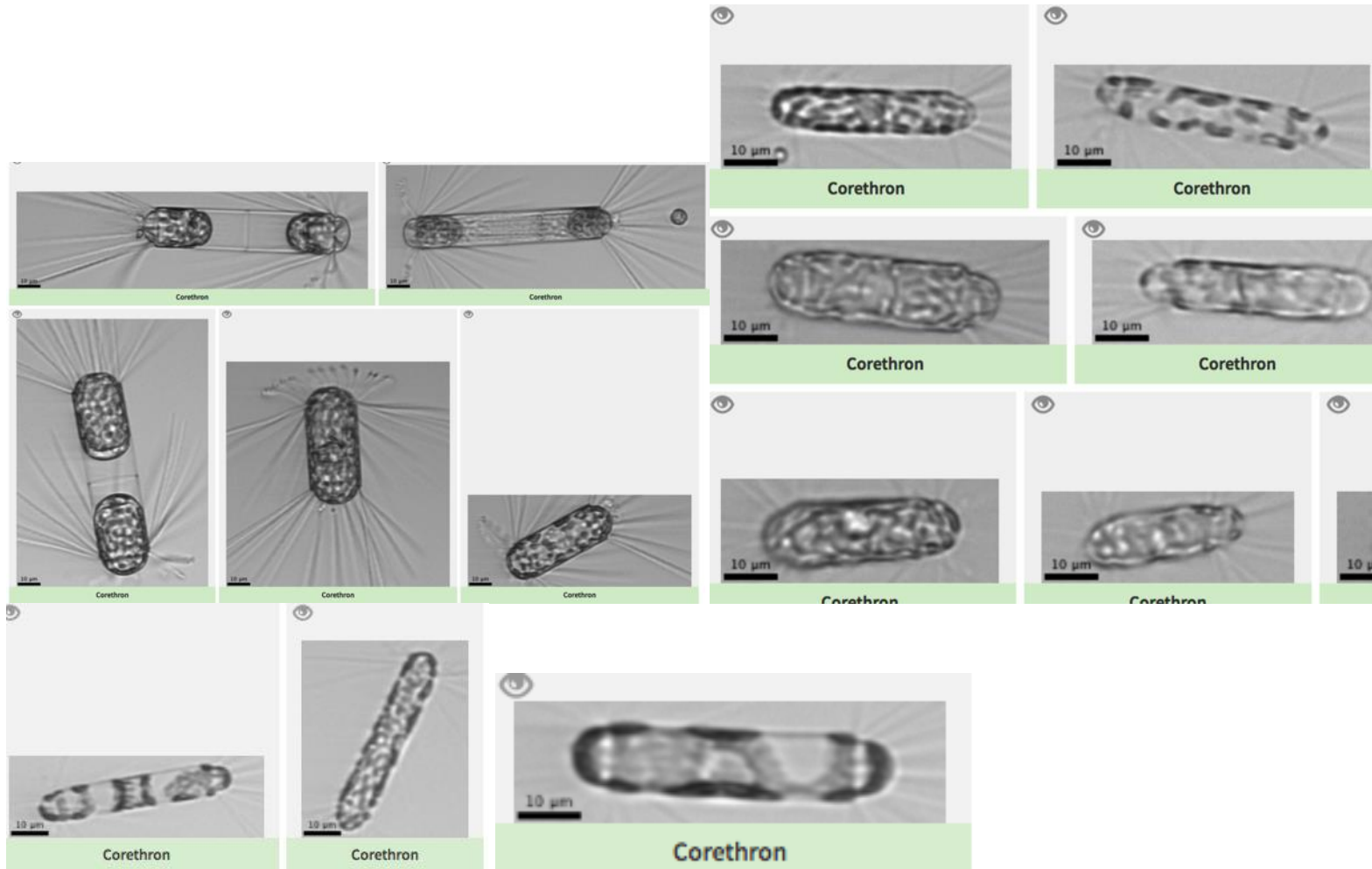
Bacteriastrum

Diatoms - *Chaetoceros*

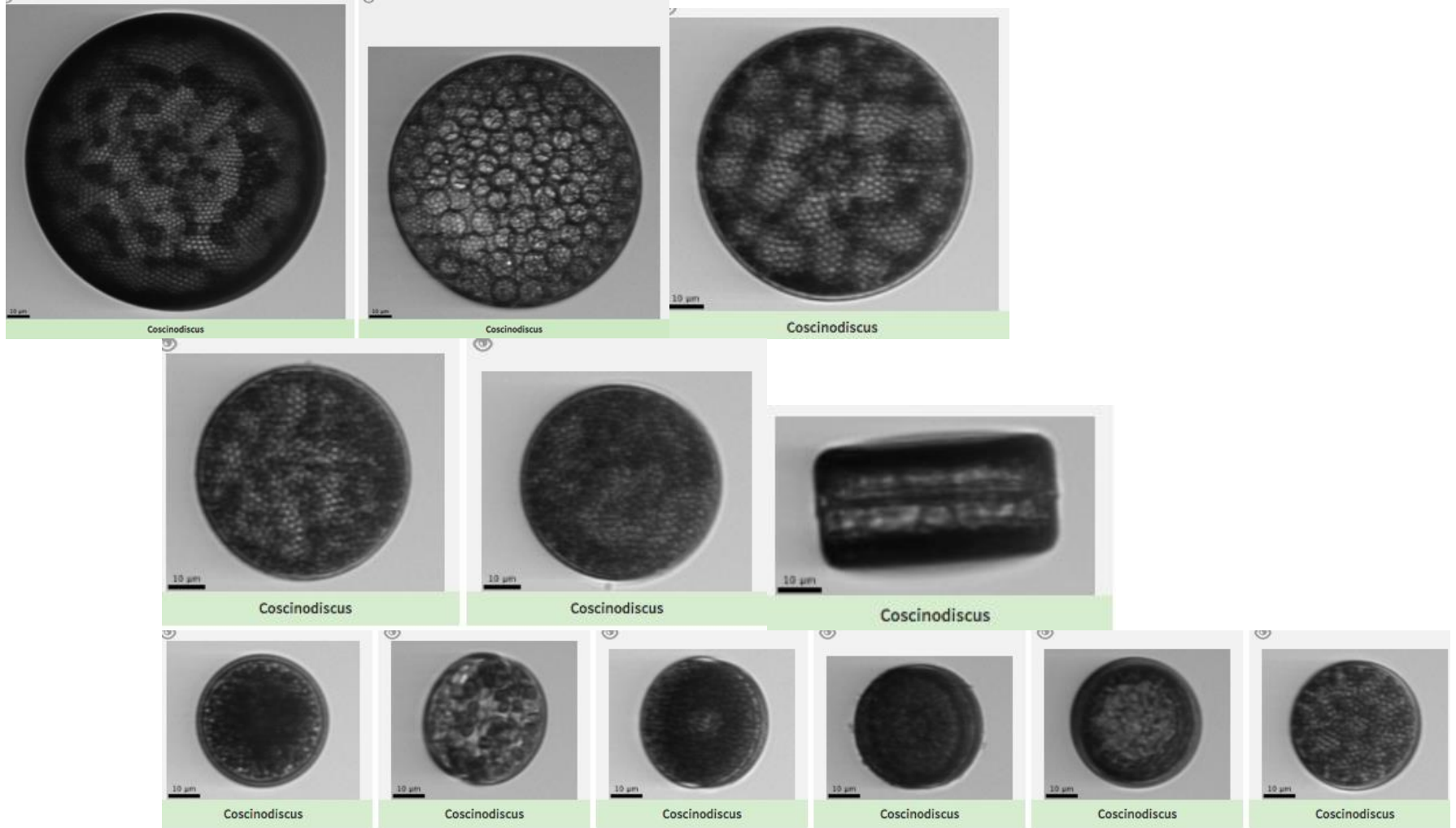


<<*Note that some *Chaetoceros* have branches similar to *Bacteriastrium*. A good rule of thumb is that most/all of the setae on *Bacteriastrium* branch out into a "Y" shape, while *Chaetoceros* will have few.

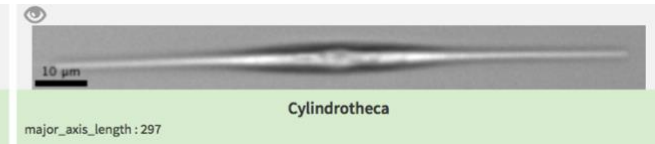
Diatoms - *Corethron*



Diatoms - *Coscinodiscus* (30-500µm in diameter)



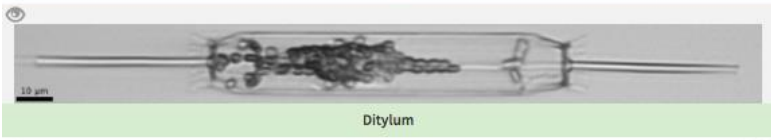
Diatoms – *Cylindrotheca*



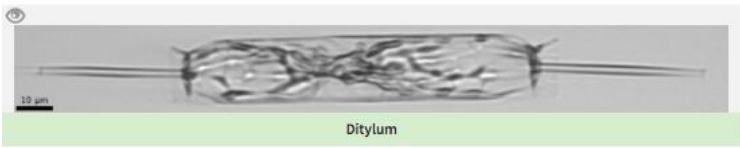
Diatoms - *Ditylum*



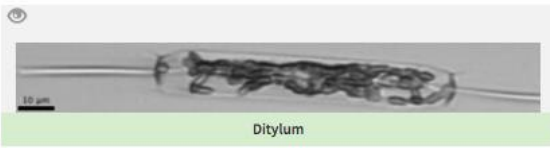
Ditylum



Ditylum

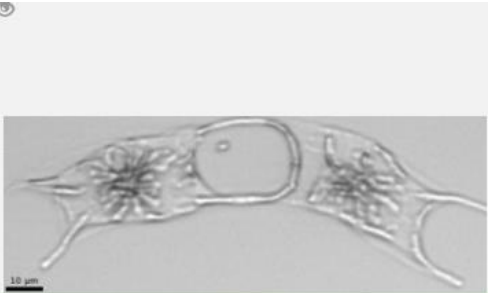


Ditylum

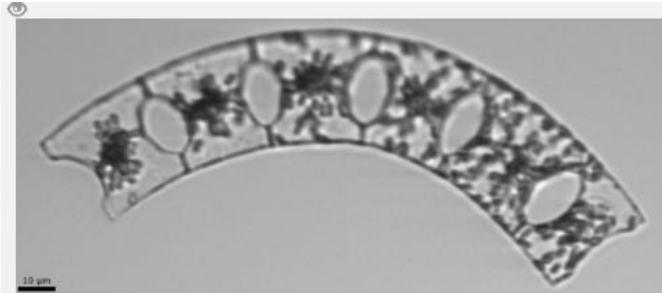


Ditylum

Diatoms - *Eucampia*



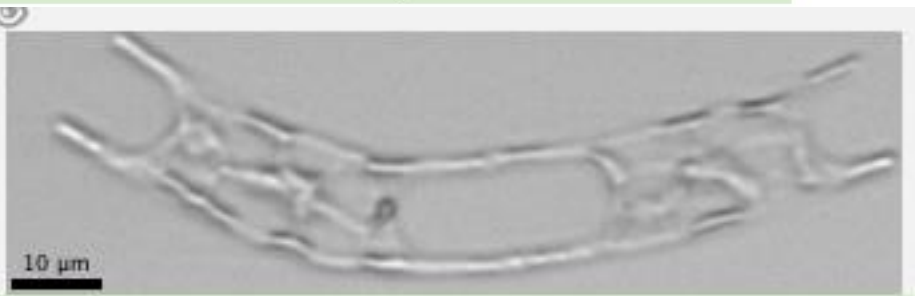
Eucampia



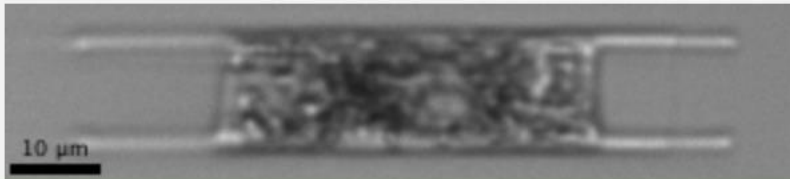
Eucampia



Eucampia

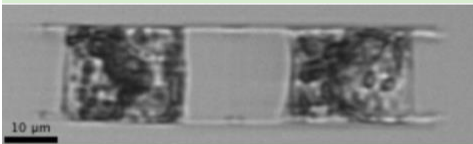


Diatoms – *Hemiaulus*



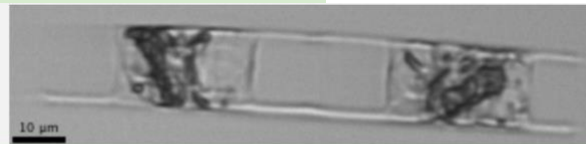
Hemiaulus

major_axis_length : 203



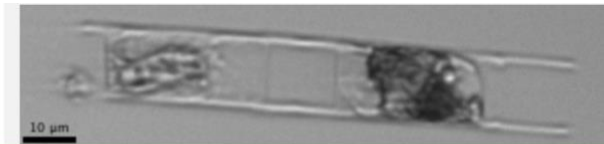
Hemiaulus

major_axis_length : 306



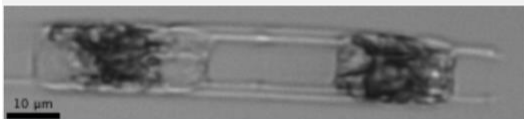
Hemiaulus

major_axis_length : 308



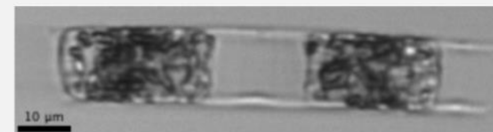
Hemiaulus

major_axis_length : 308



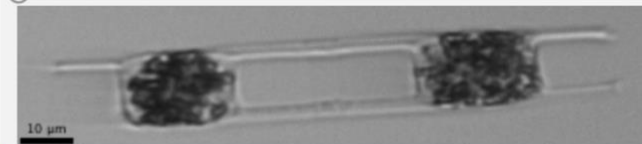
Hemiaulus

major_axis_length : 314



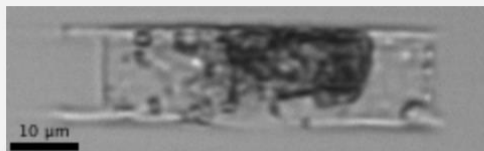
Hemiaulus

major_axis_length : 321



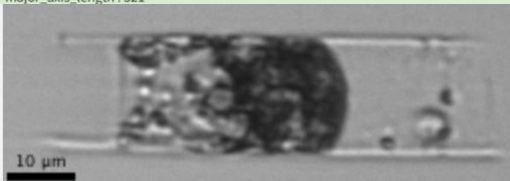
Hemiaulus

major_axis_length : 329



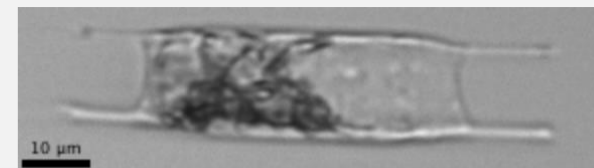
Hemiaulus

major_axis_length : 201



Hemiaulus

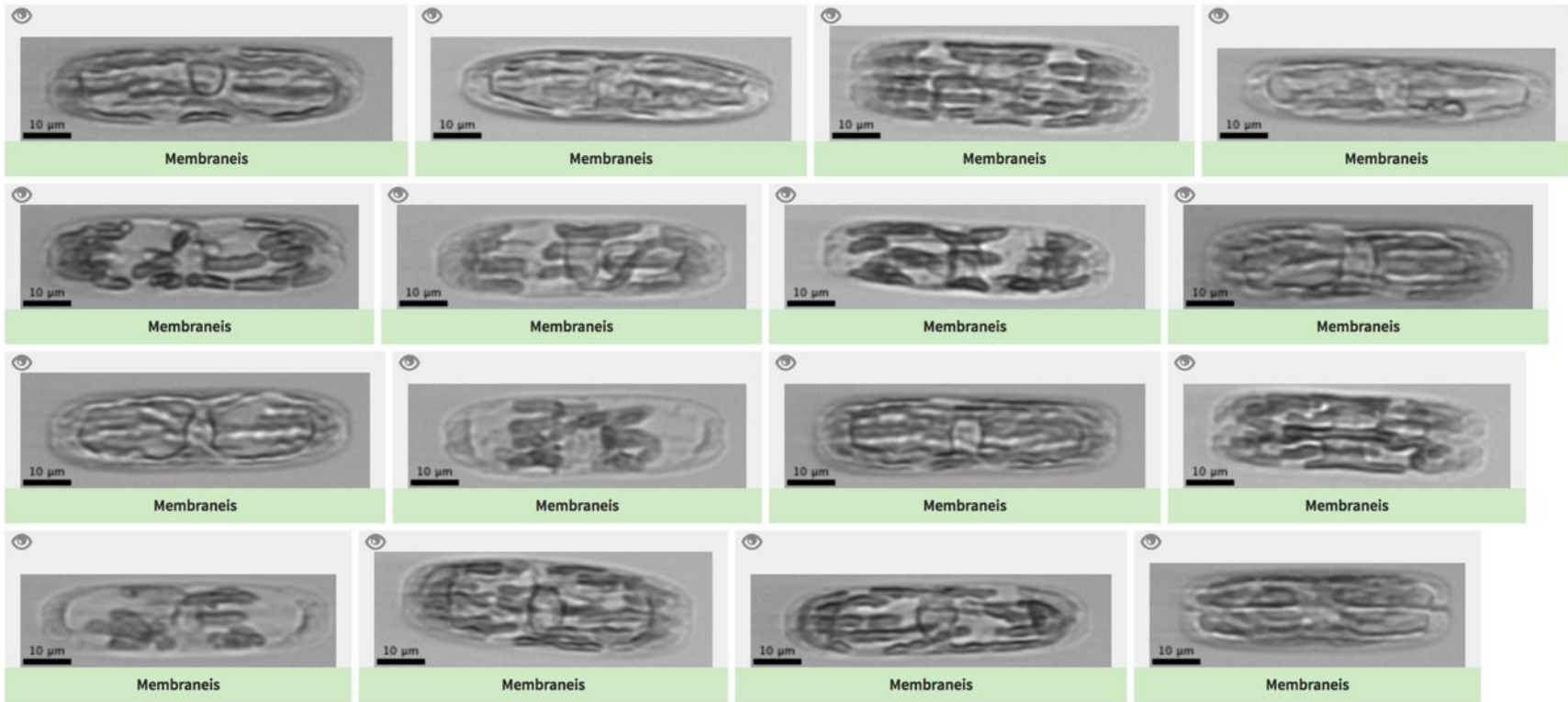
major_axis_length : 201



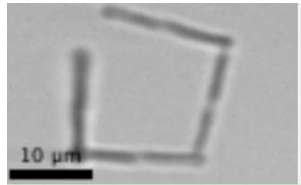
Hemiaulus

major_axis_length : 203

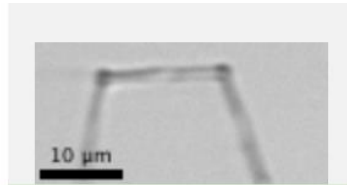
Diatoms - *Membraneis* (a.k.a. *Tropidoneis* or *Plagiotropis*)



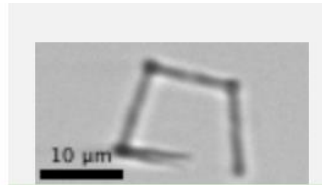
Diatoms - *Nanoneis*



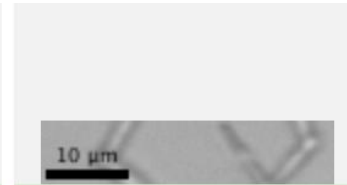
Nanoneis



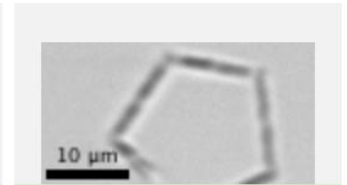
Nanoneis



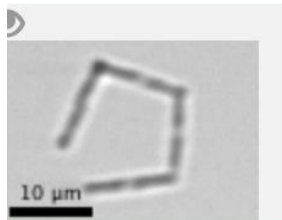
Nanoneis



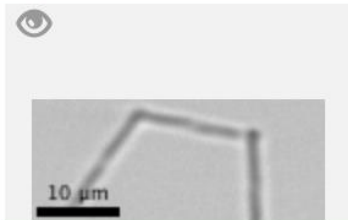
Nanoneis



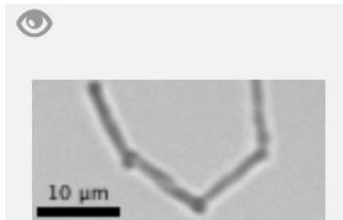
Nanoneis



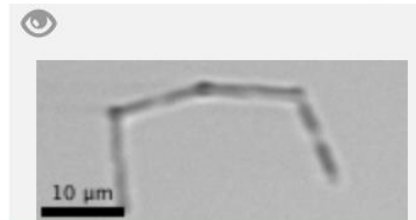
Nanoneis



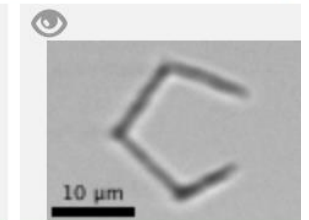
Nanoneis



Nanoneis

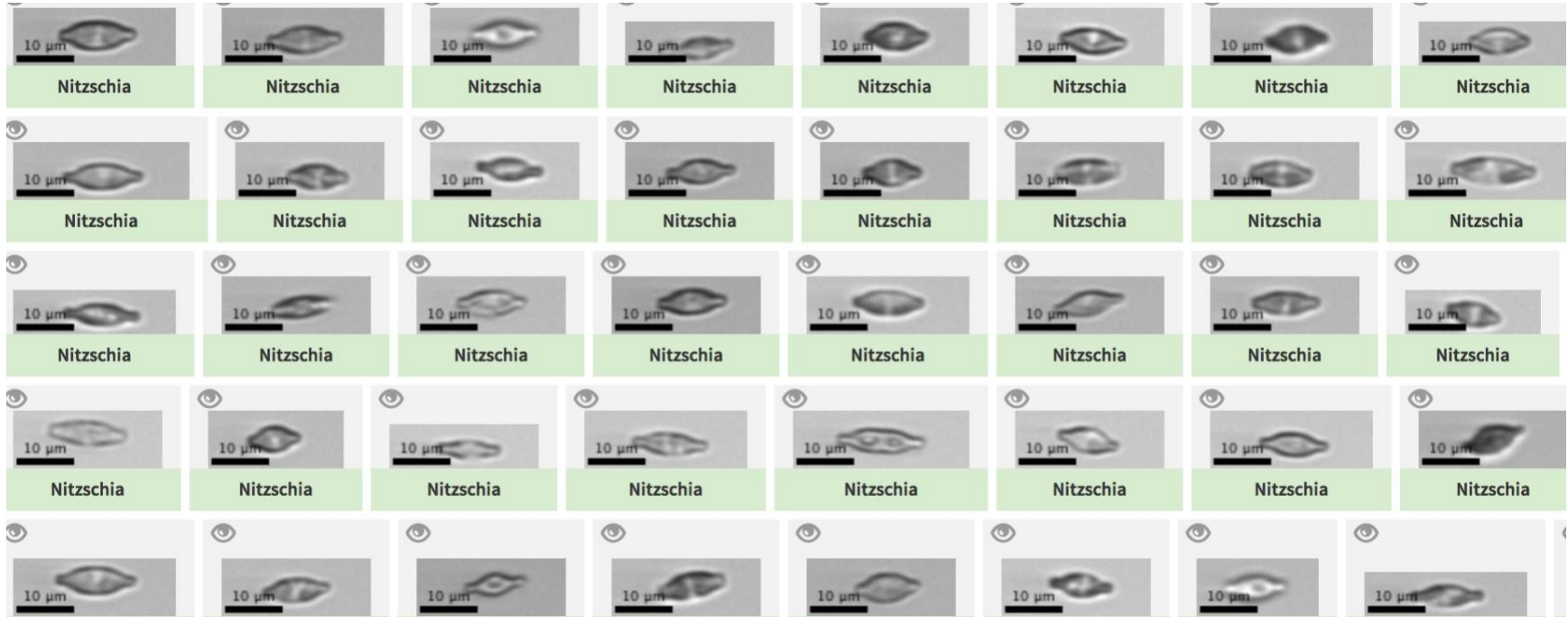


Nanoneis

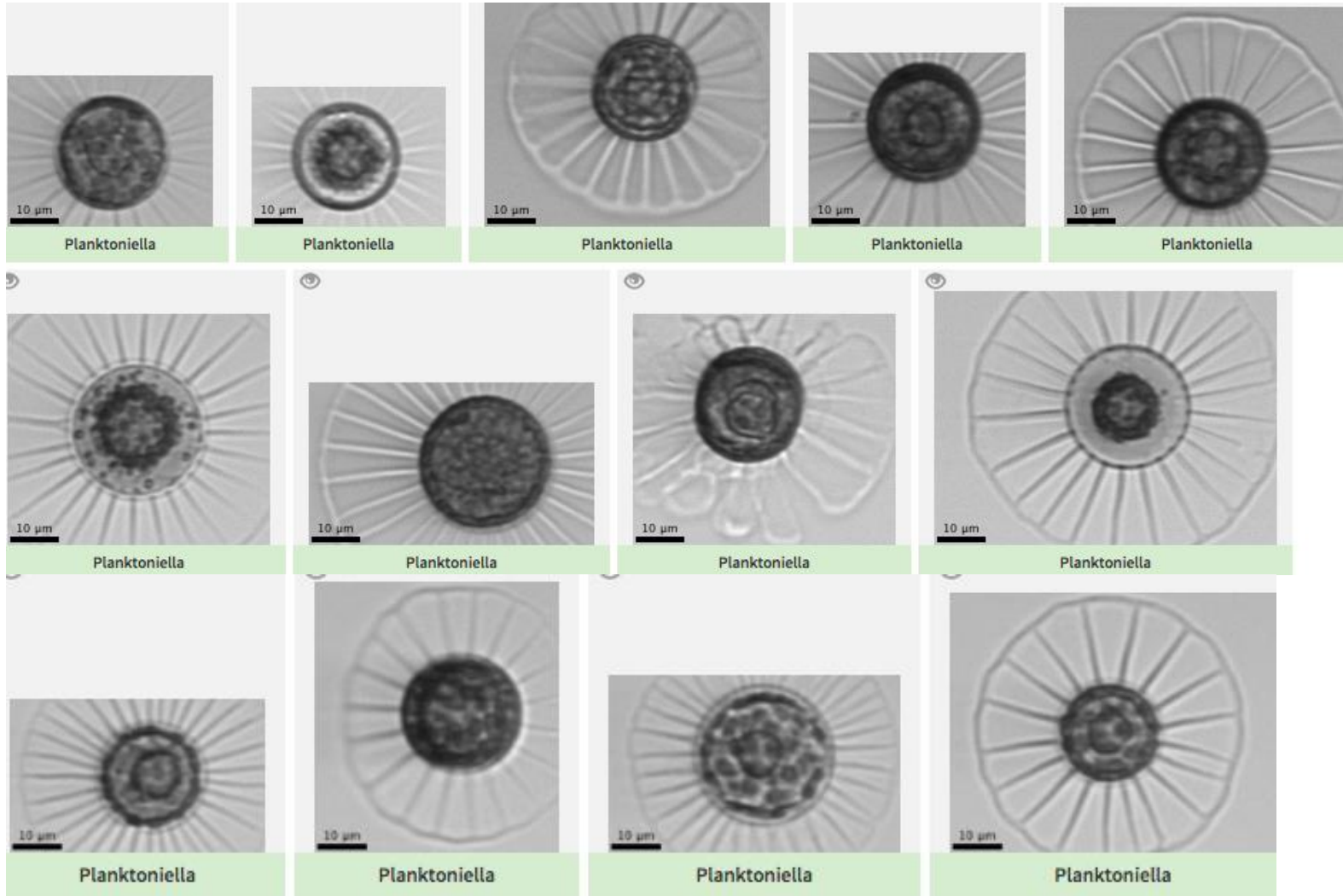


Nanoneis

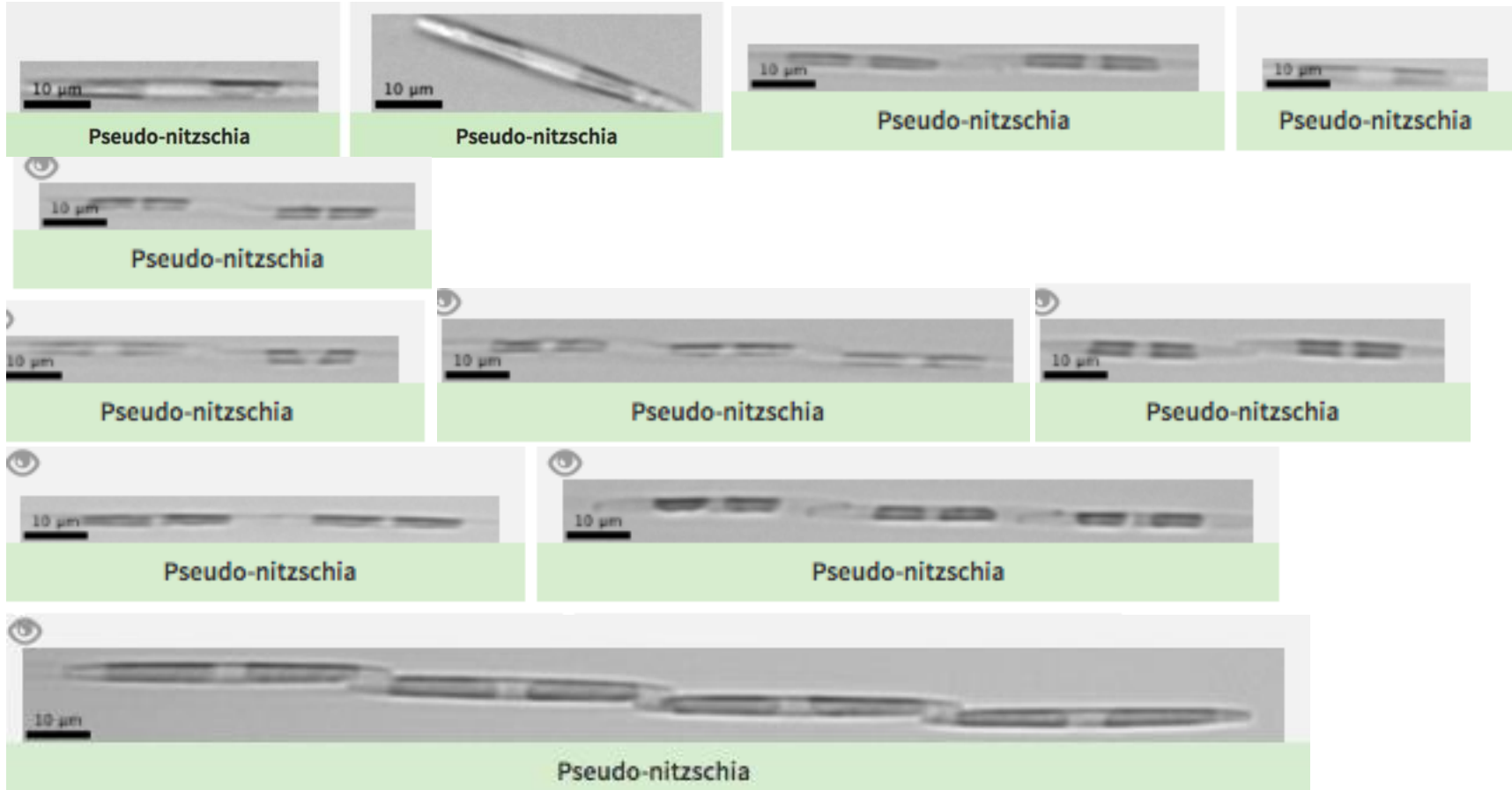
Diatoms - *Nitzschia*



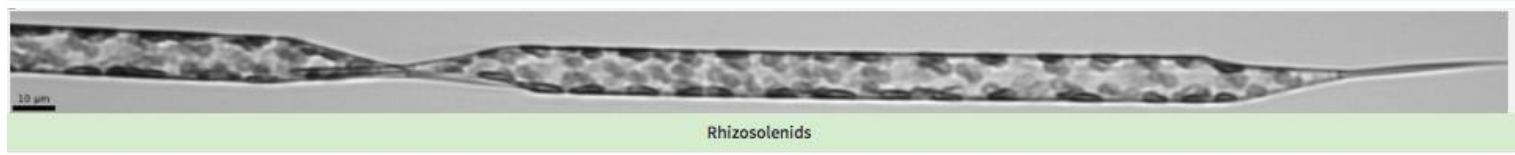
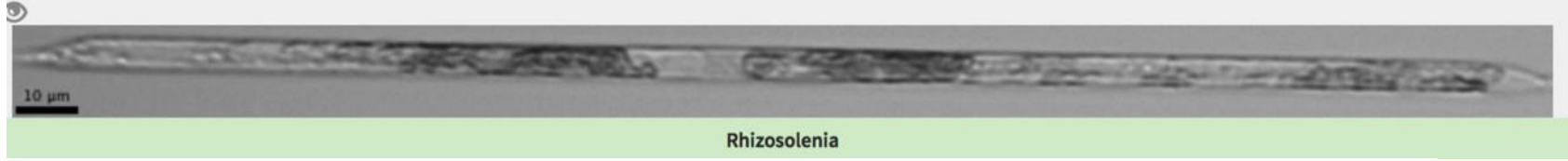
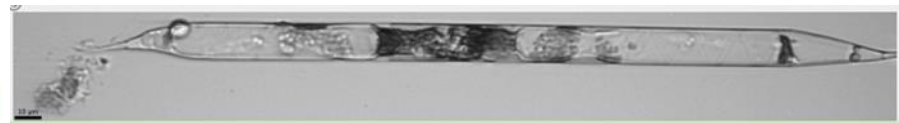
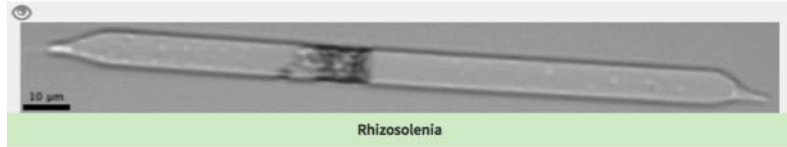
Diatoms - *Planktoniella*



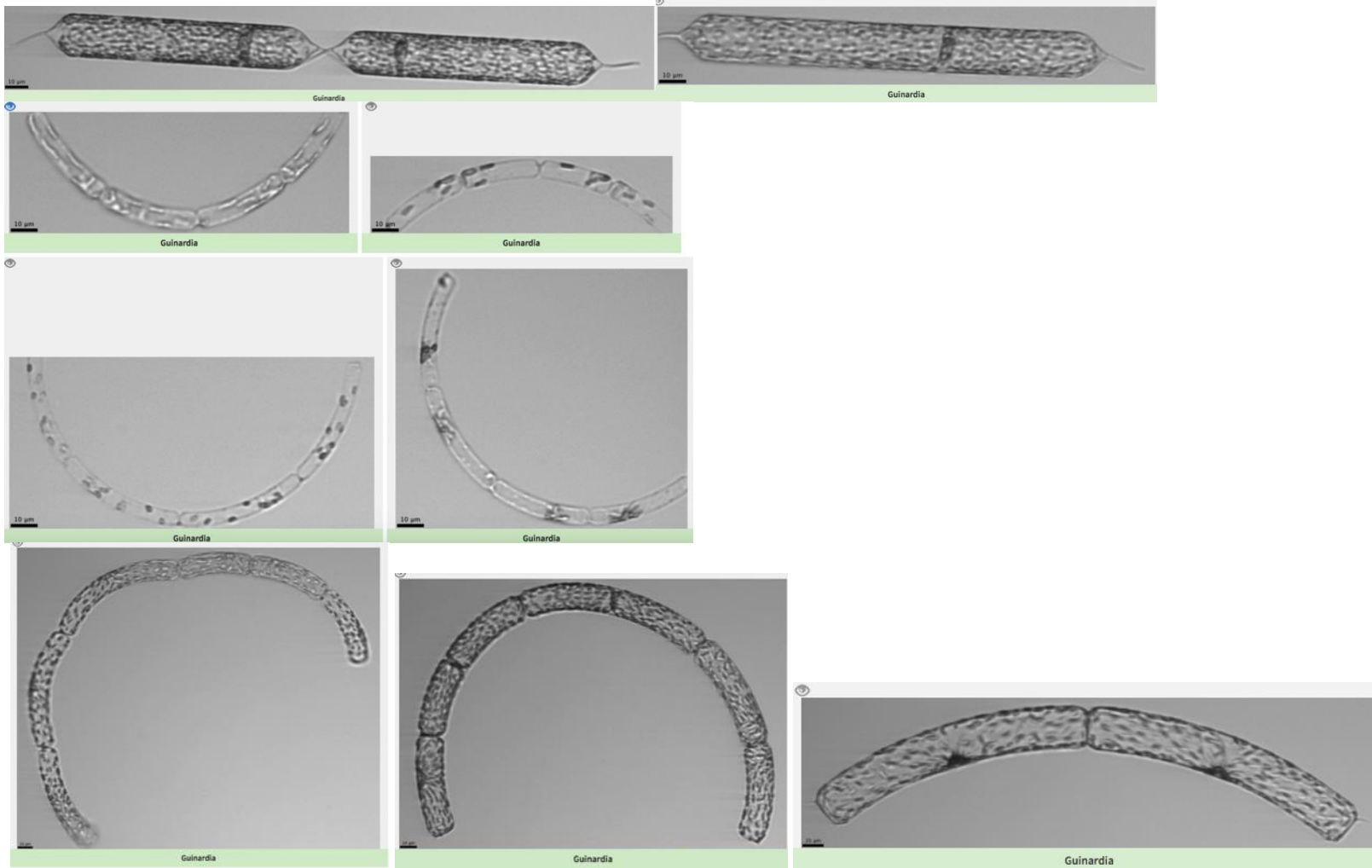
Diatoms – *Pseudo-nitzschia*



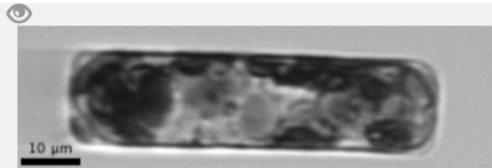
Diatoms - *Rhizosolenia*



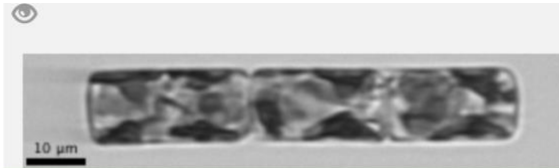
Diatoms – *Guinardia*



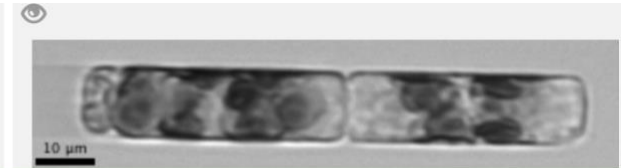
Diatoms – *Guinardia delicatula*



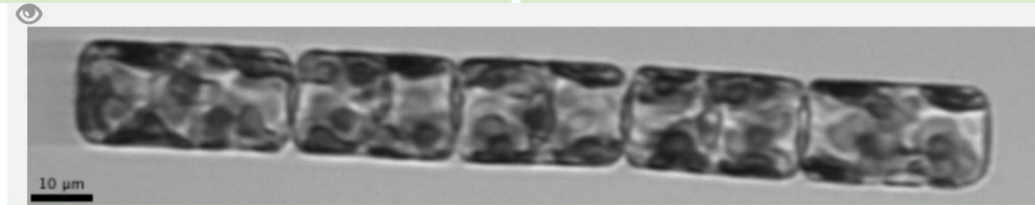
Guinardia delicatula



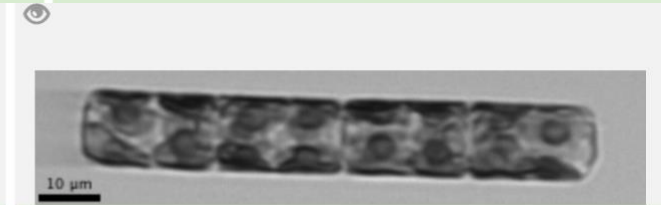
Guinardia delicatula



Guinardia delicatula



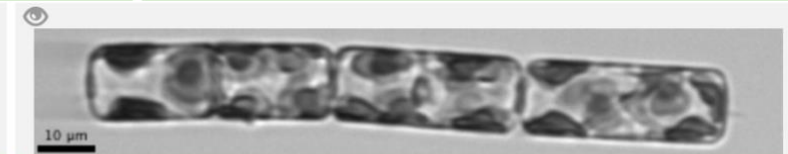
Guinardia delicatula



Guinardia delicatula

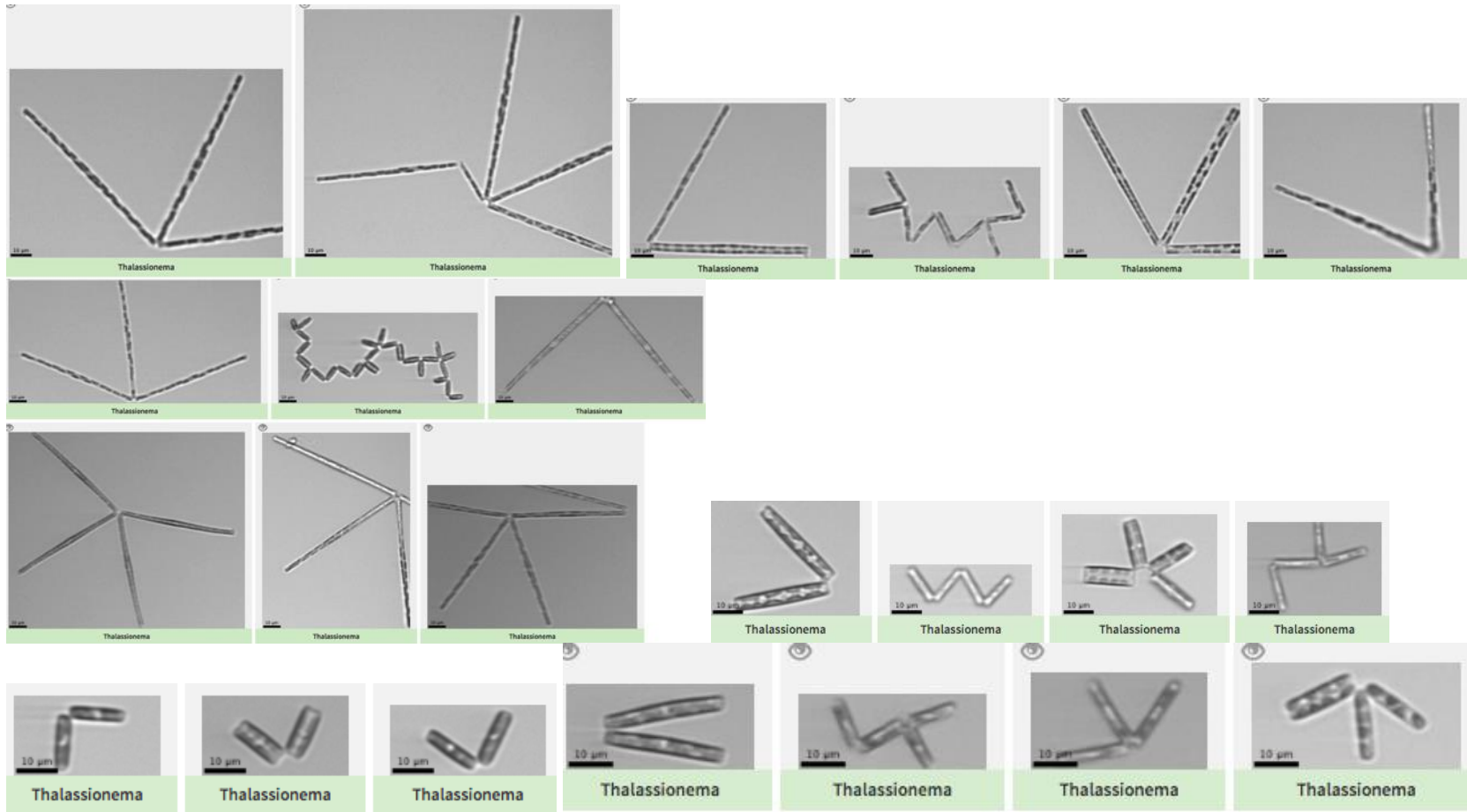


Guinardia delicatula

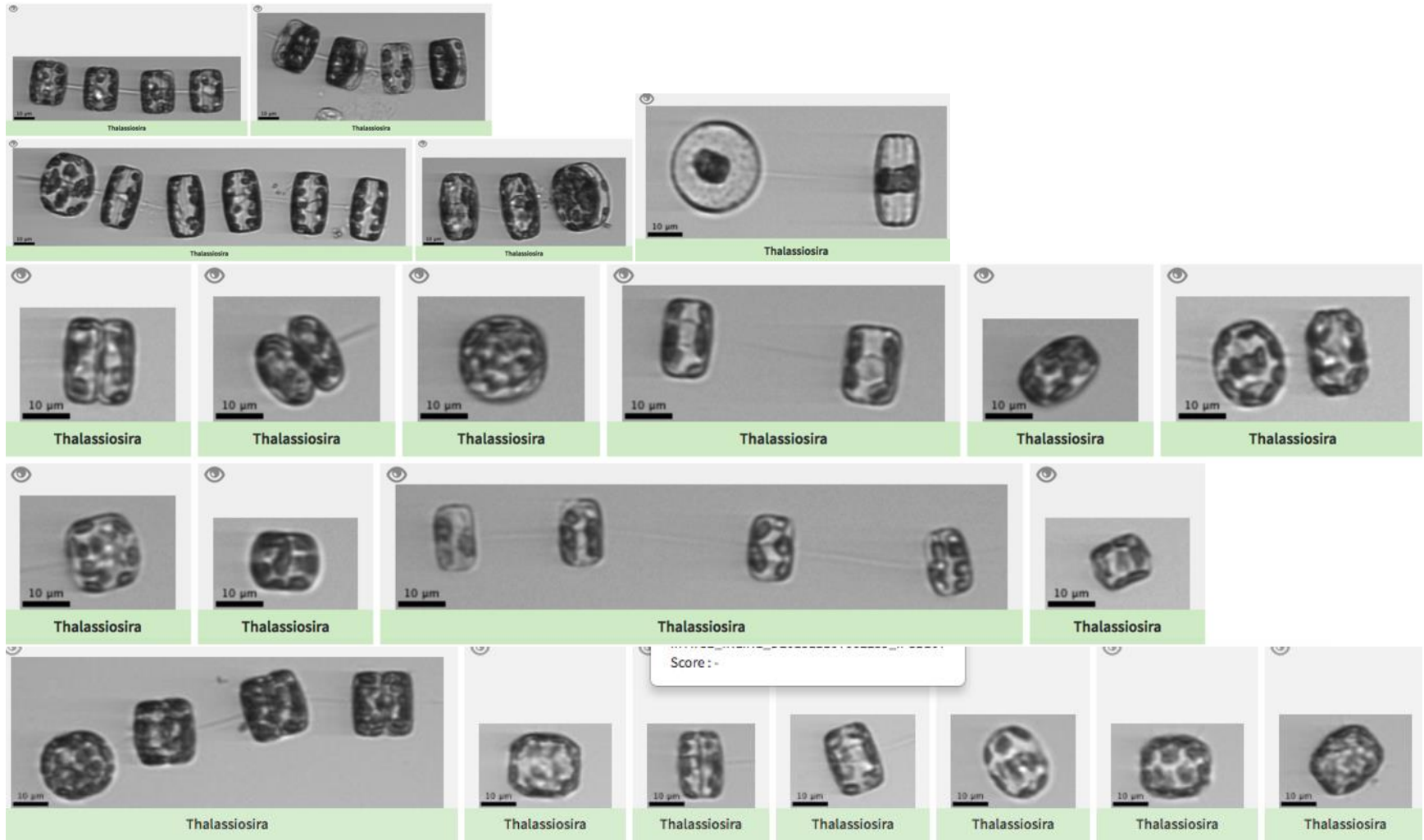


Guinardia delicatula

Diatoms – *Thalassionema*



Diatoms - *Thalassiosira*



Diatoms - *Skeletonema*



Skeletonema

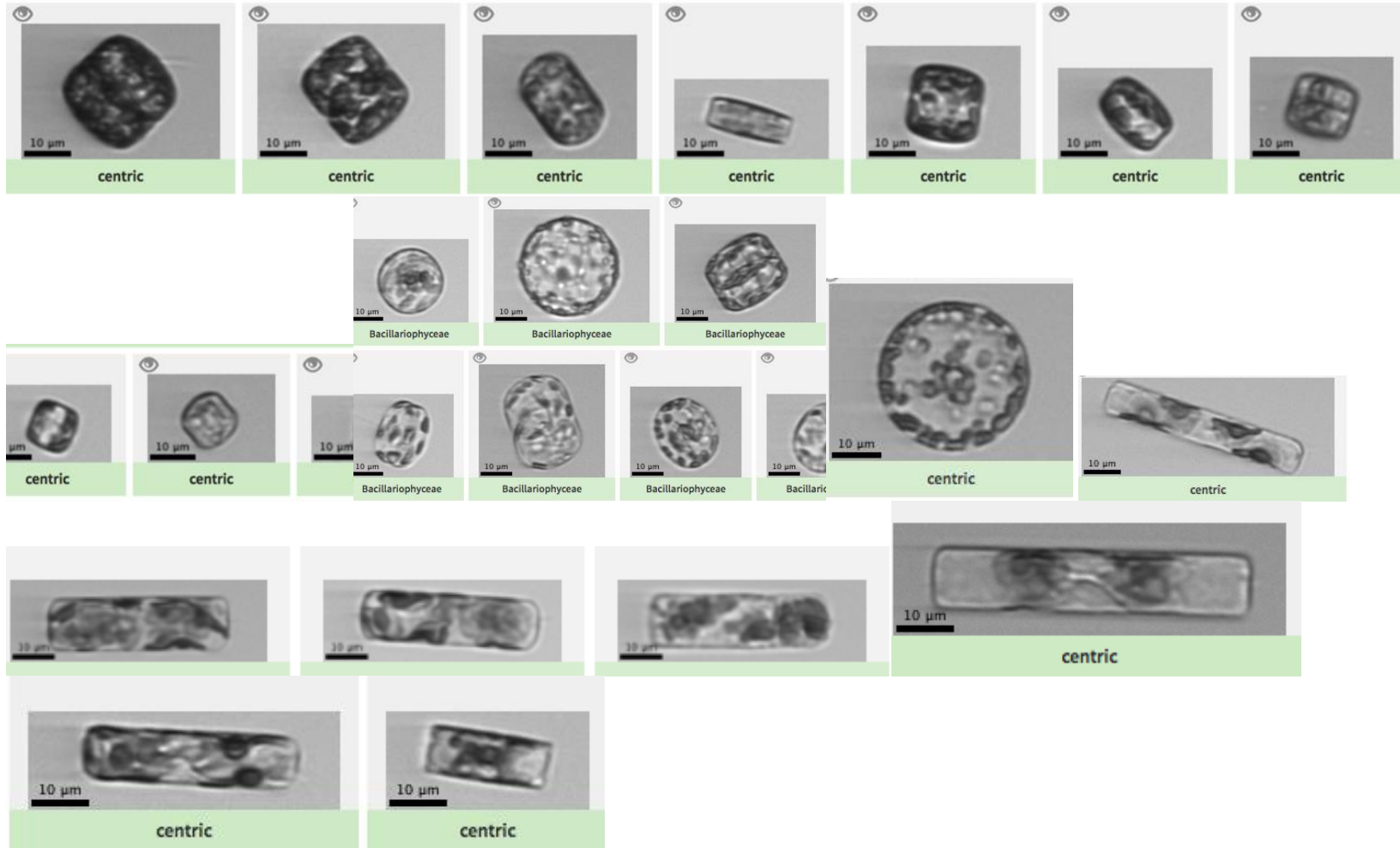


Skeletonema

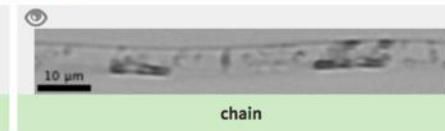
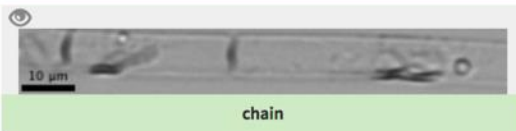
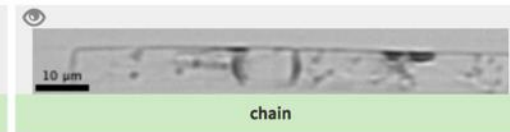
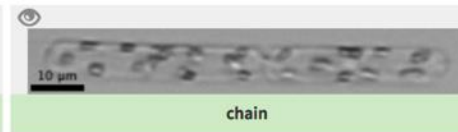
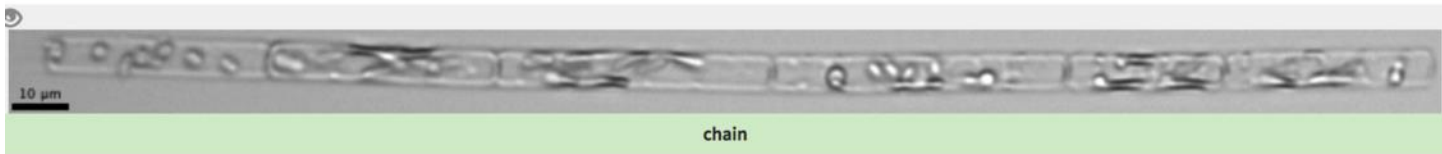
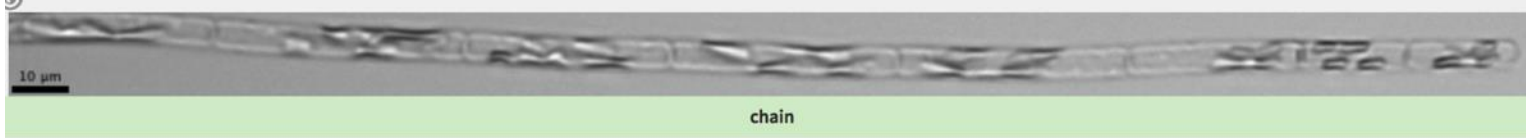


Skeletonema

Diatoms - Centric



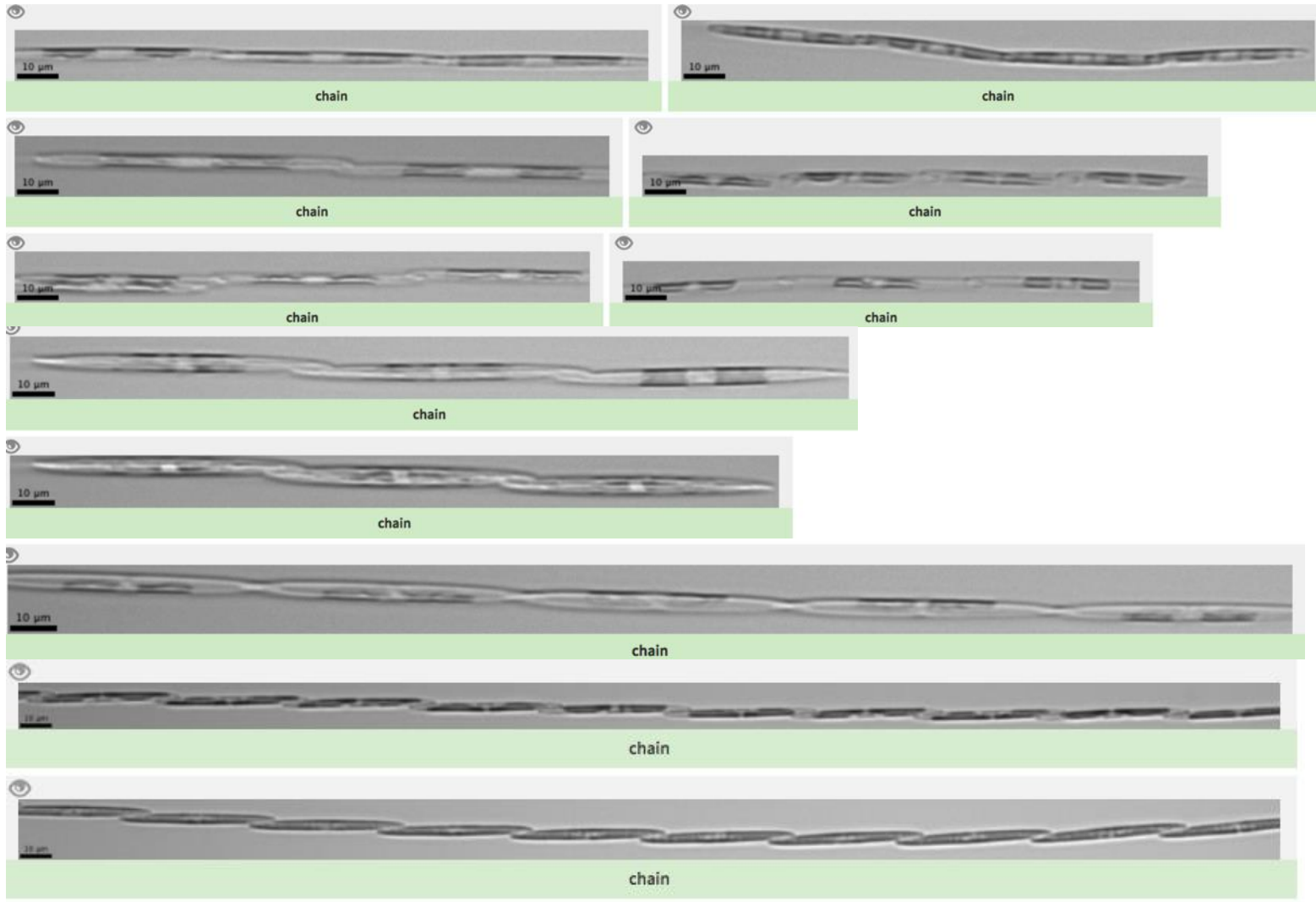
Diatoms – Centric Chain



Diatoms - Pennate



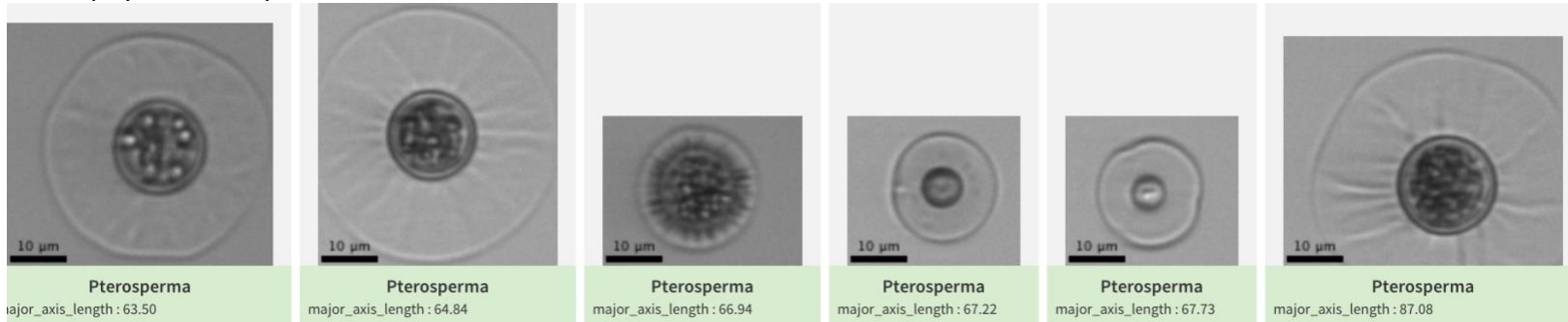
Diatoms – Pennate Chain



Chlorophyta – *Pyramimonas*



Chlorophyta - *Pterosperma*

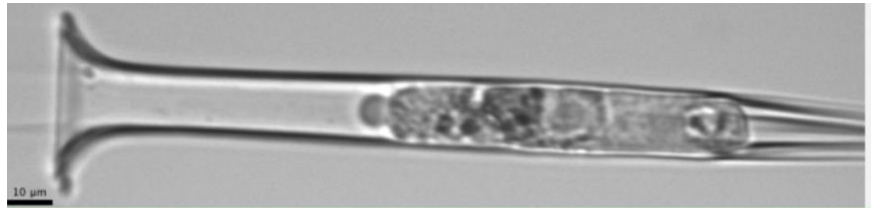


NOTE: In this case the phylum of Chlorophyta is used; both the Chlorophyceae and Prasinophyceae classes are classified here, as the cells can be difficult to differentiate.

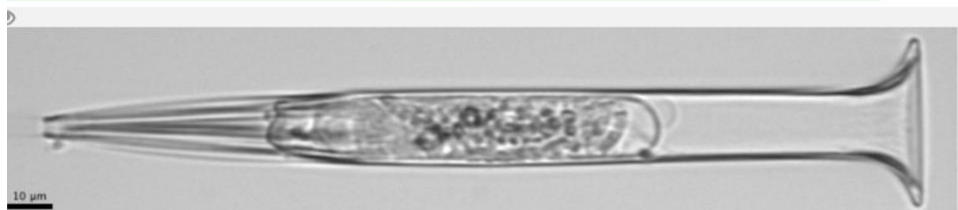
Ciliophora (Ciliates)



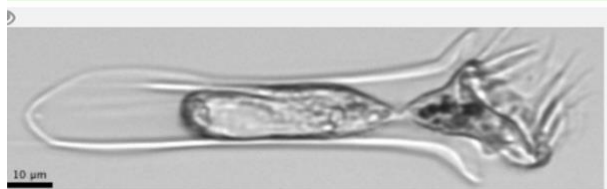
Ciliophora - Tintinnida



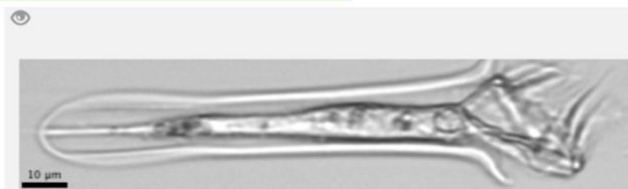
Tintinnida



Tintinnida

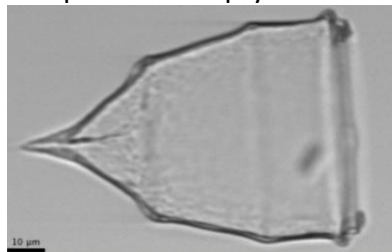


Tintinnida

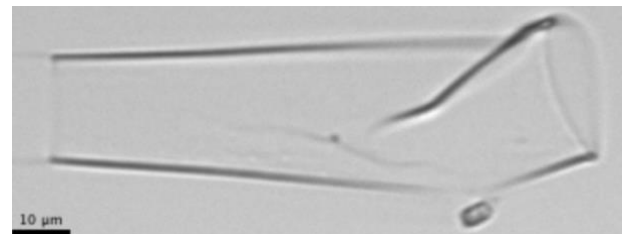


Tintinnida

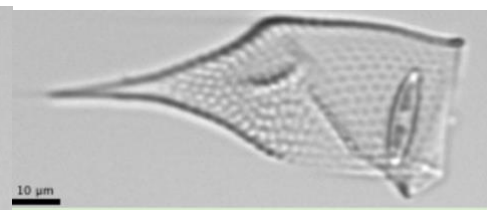
Ciliophora – “Empty”



empty



10 µm

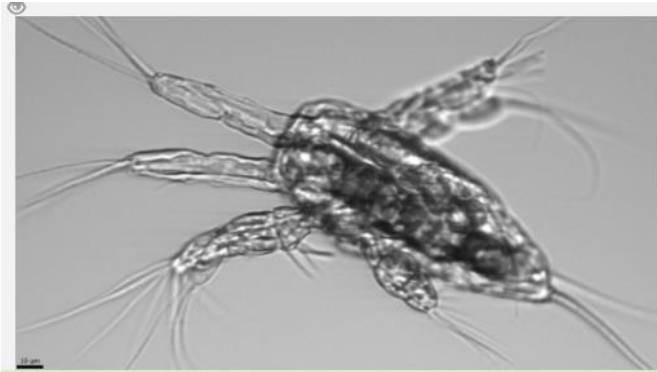


empty

Crustacea



Crustacea



Crustacea

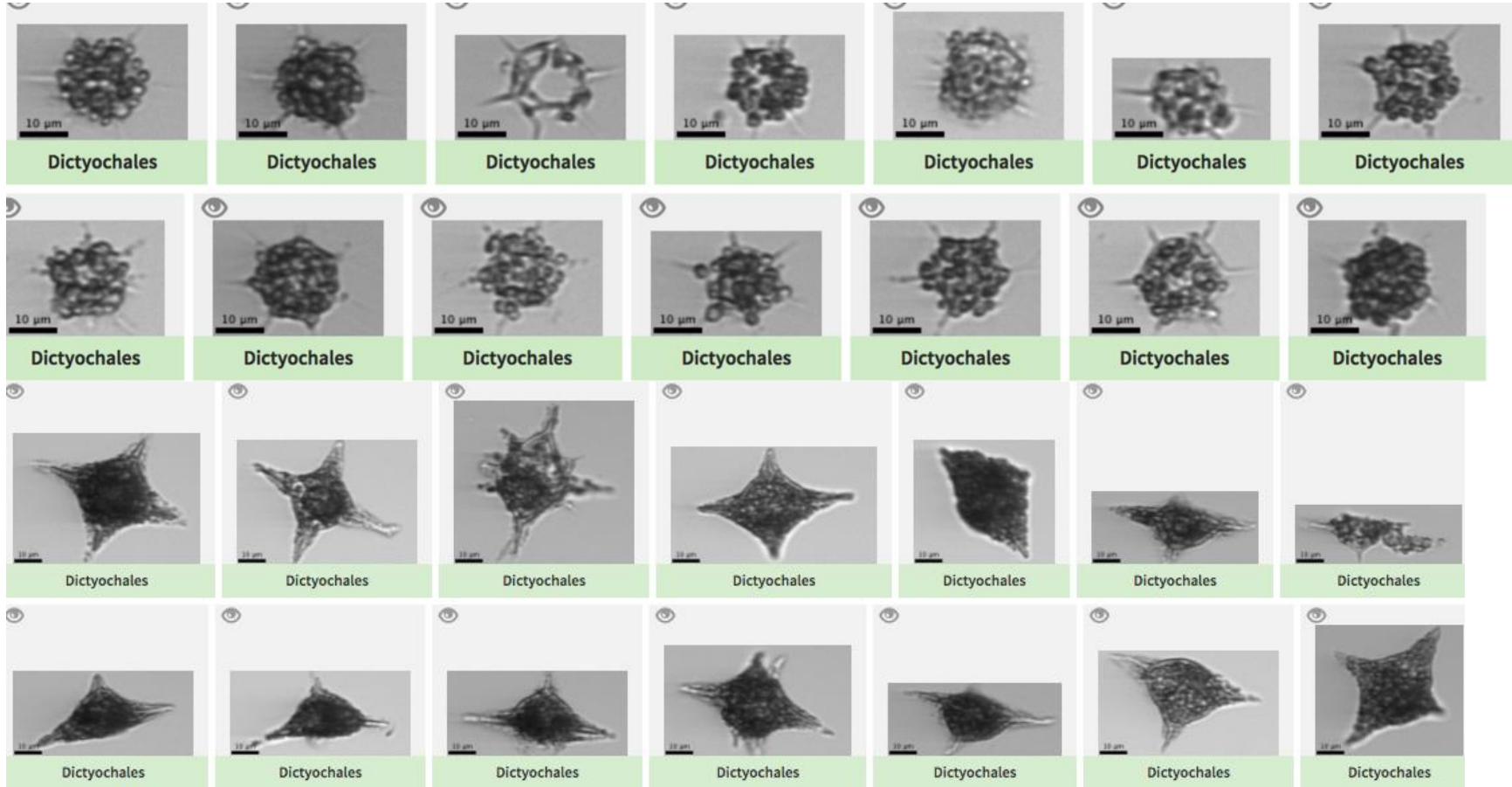


Crustacea



Crustacea

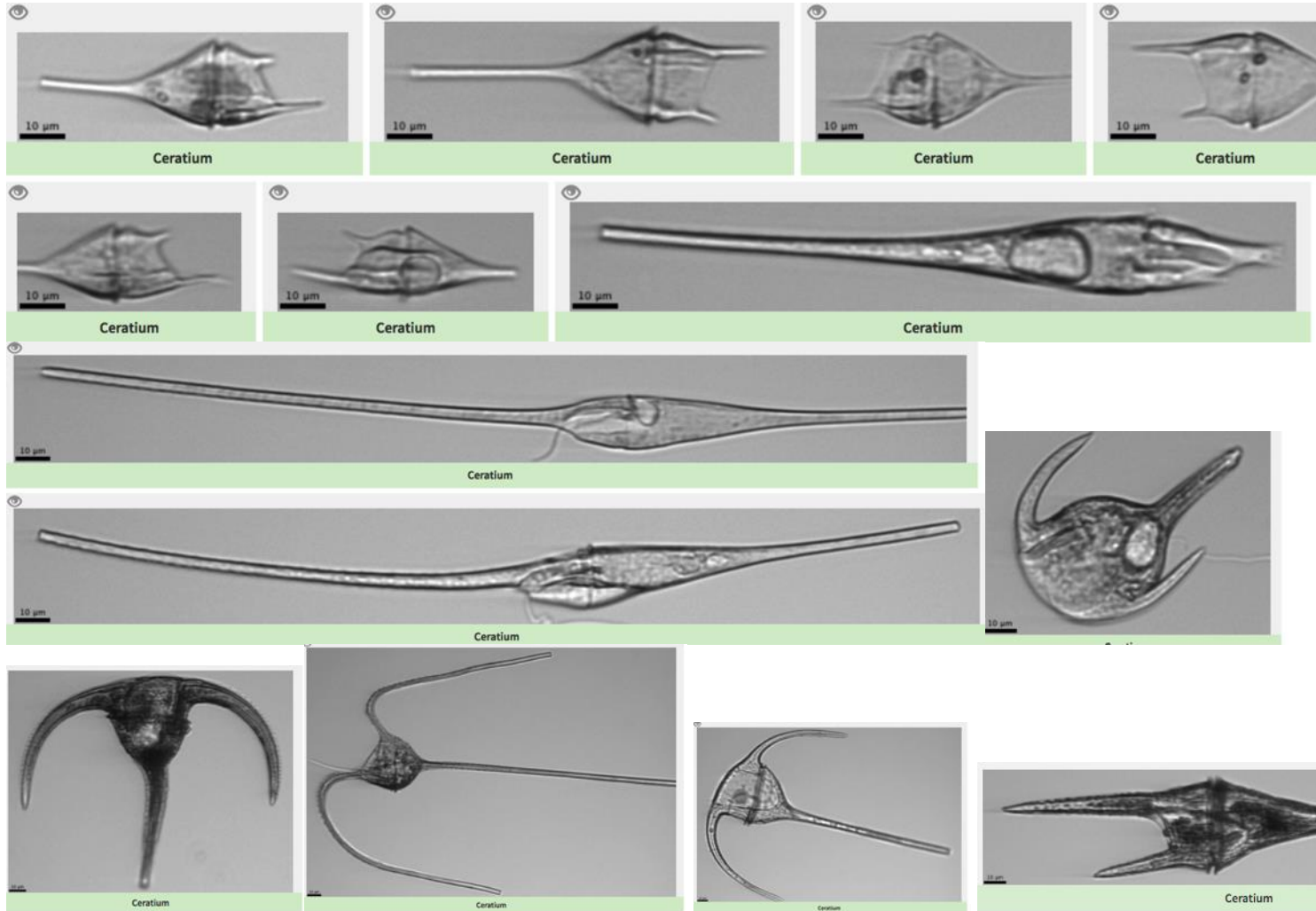
Dictyochales



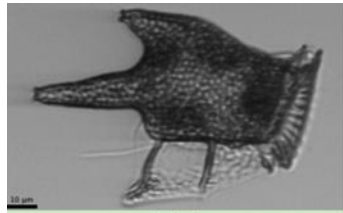
Dinobryon



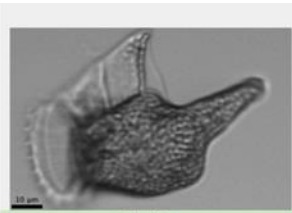
Dinoflagellates - *Ceratium*



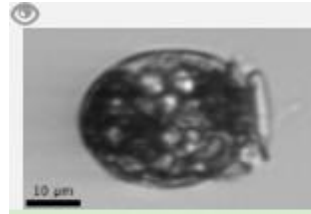
Dinoflagellates - *Dinophysis*



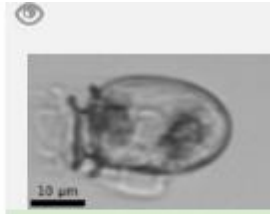
Dinophysis



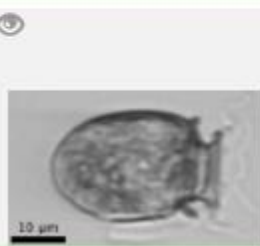
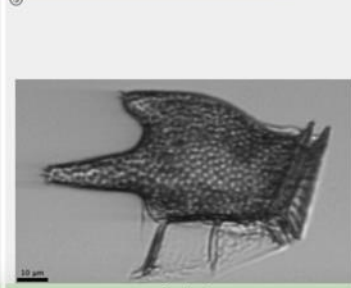
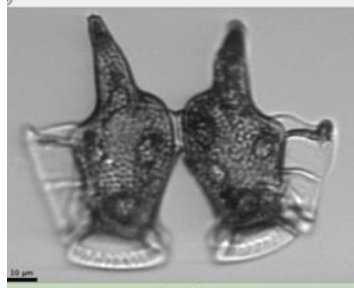
Dinophysis



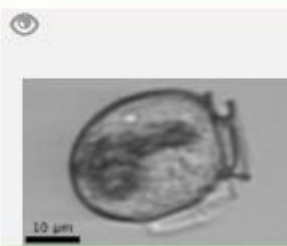
Dinophysis



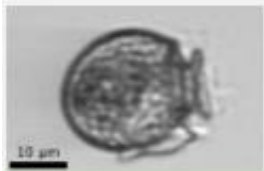
Dinophysis



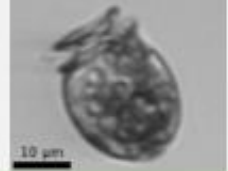
Dinophysis



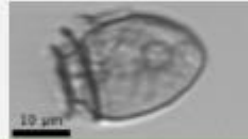
Dinophysis



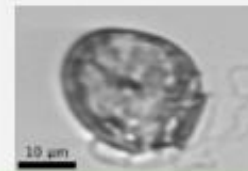
Dinophysis



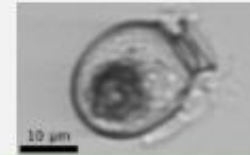
Dinophysis



Dinophysis



Dinophysis



Dinophysis



Dinophysis



Dinophysis



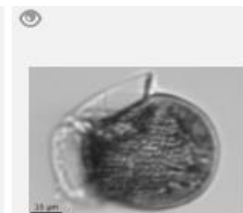
Dinophysis



Dinophysis

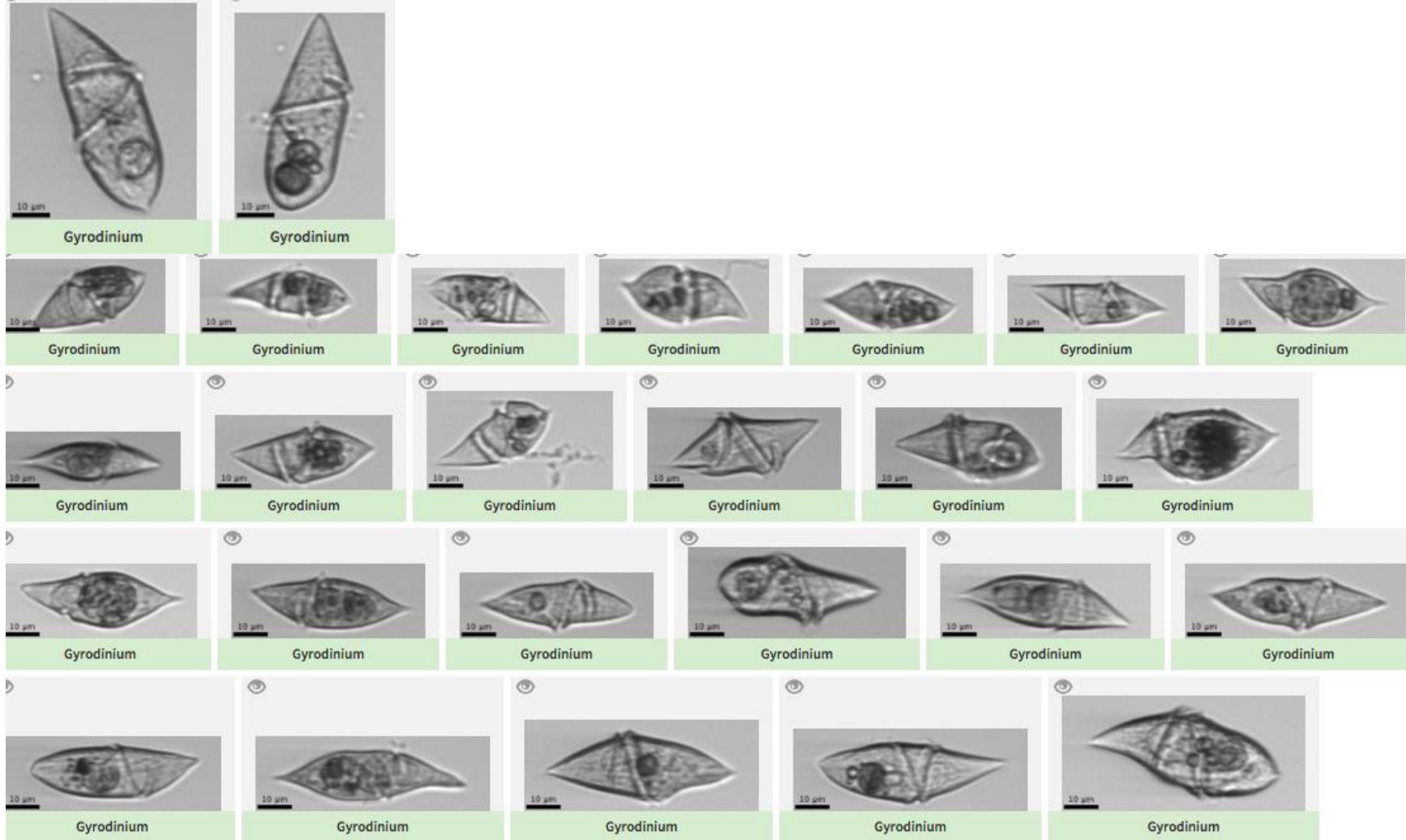


Dinophysis

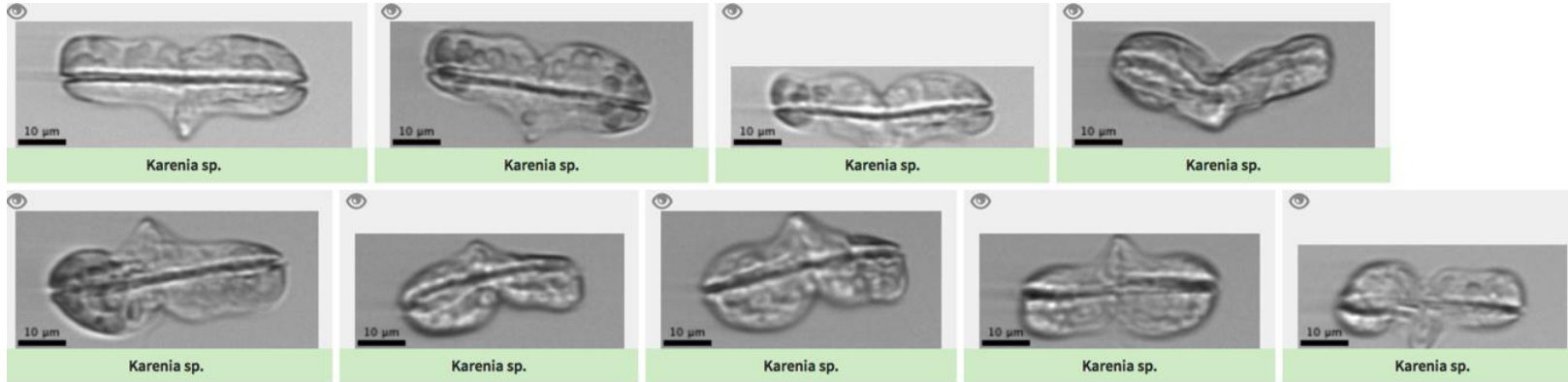


Dinophysis

Dinoflagellates - *Gyrodinium*



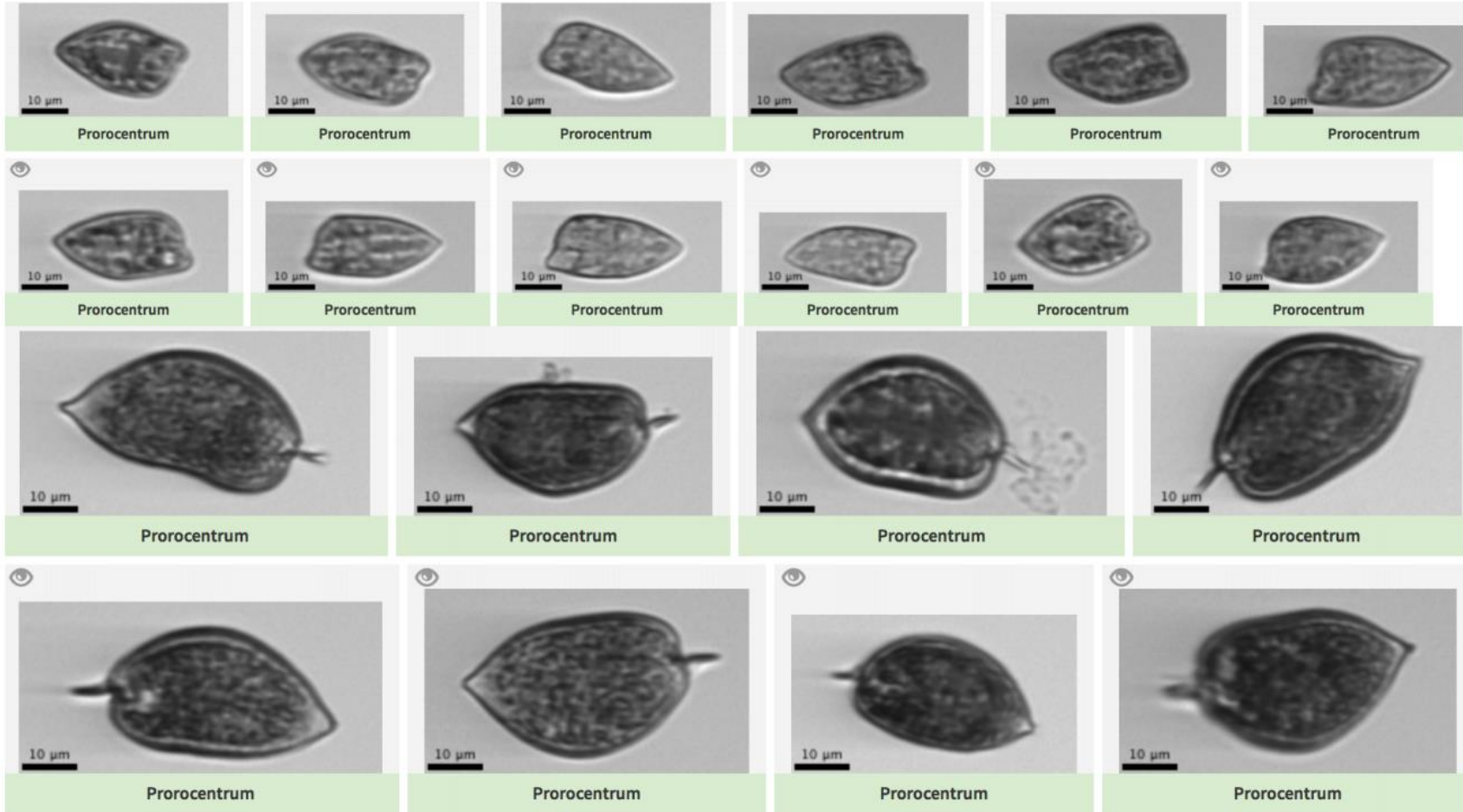
Dinoflagellates - *Karenia*



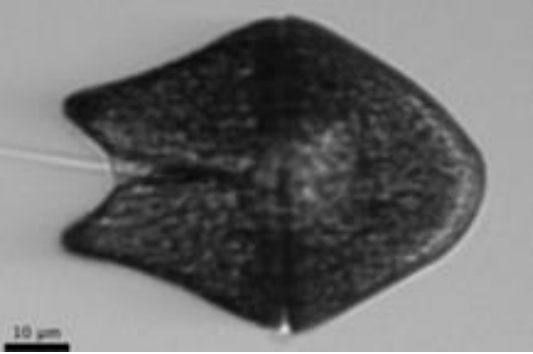
Dinoflagellates - *Oxytoxum*



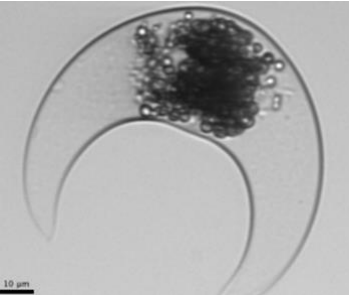
Dinoflagellates - *Prorocentrum*



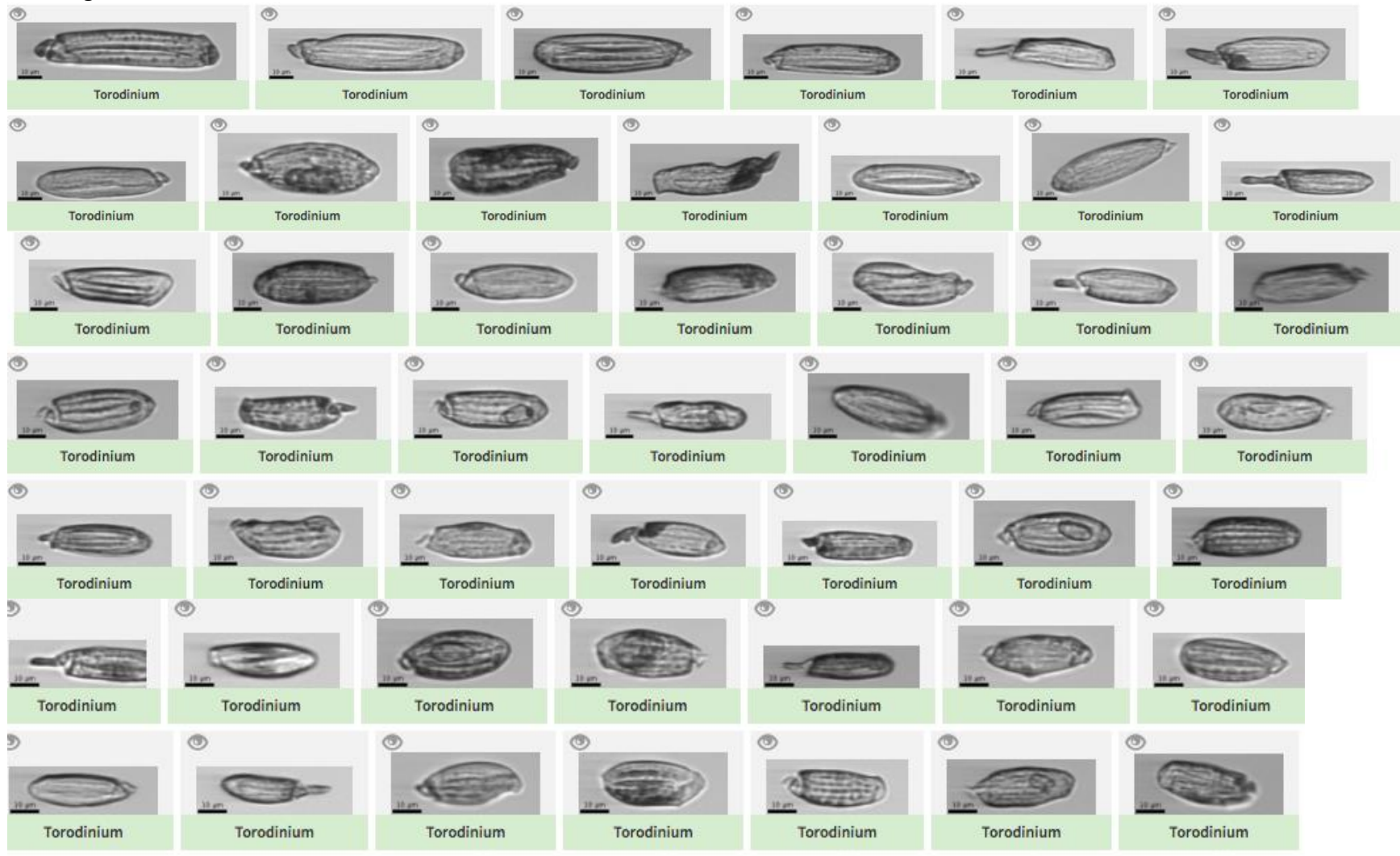
Dinoflagellates – *Akashiwo*



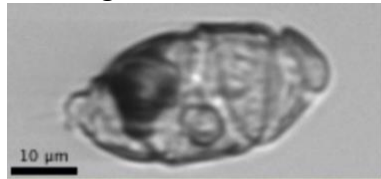
Dinoflagellates – *Pyrocystis*



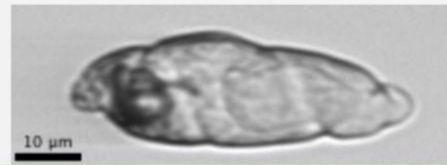
Dinoflagellates - *Torodinium*



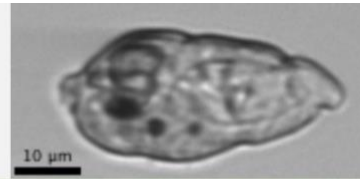
Dinoflagellates – *Warnowia*



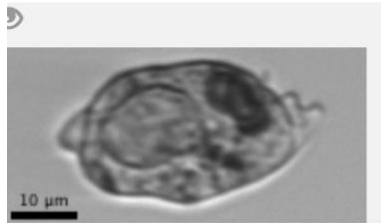
Warnowia



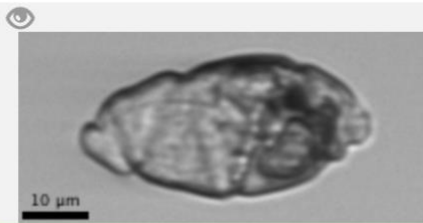
Warnowia



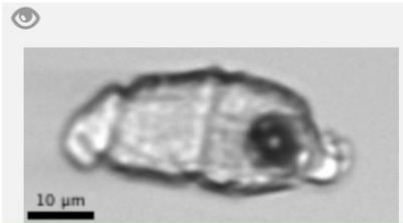
Warnowia



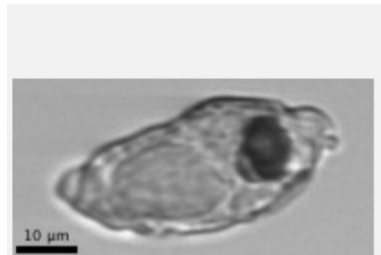
Warnowia



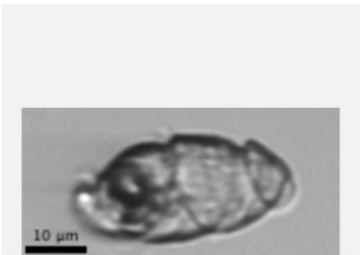
Warnowia



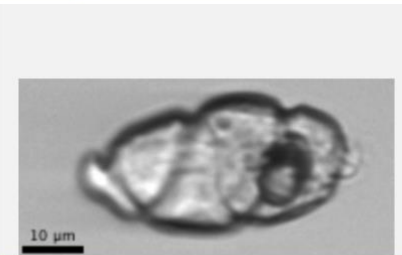
Warnowia



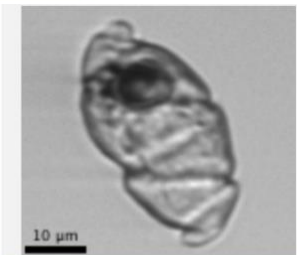
Warnowia



Warnowia

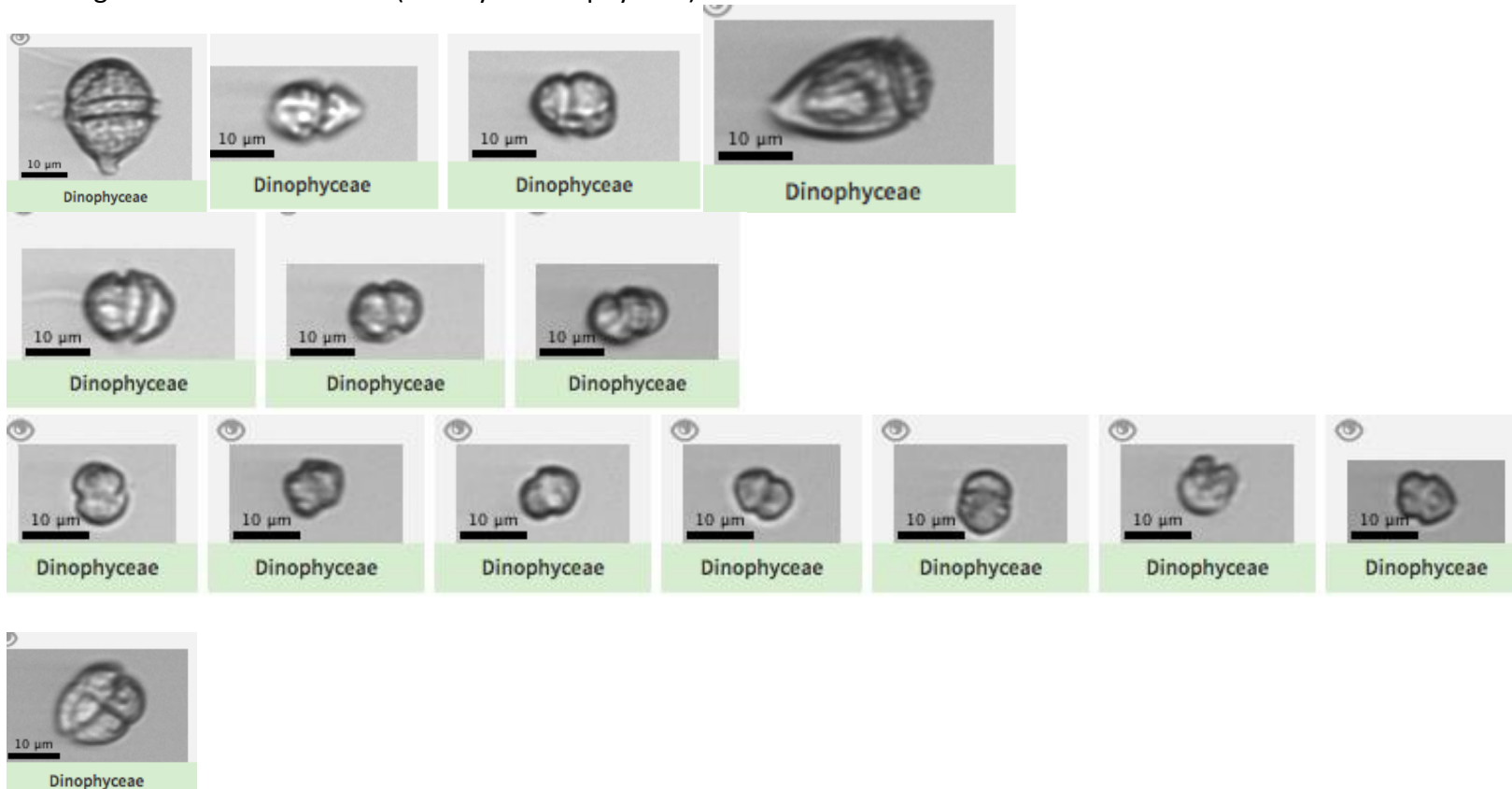


Warnowia

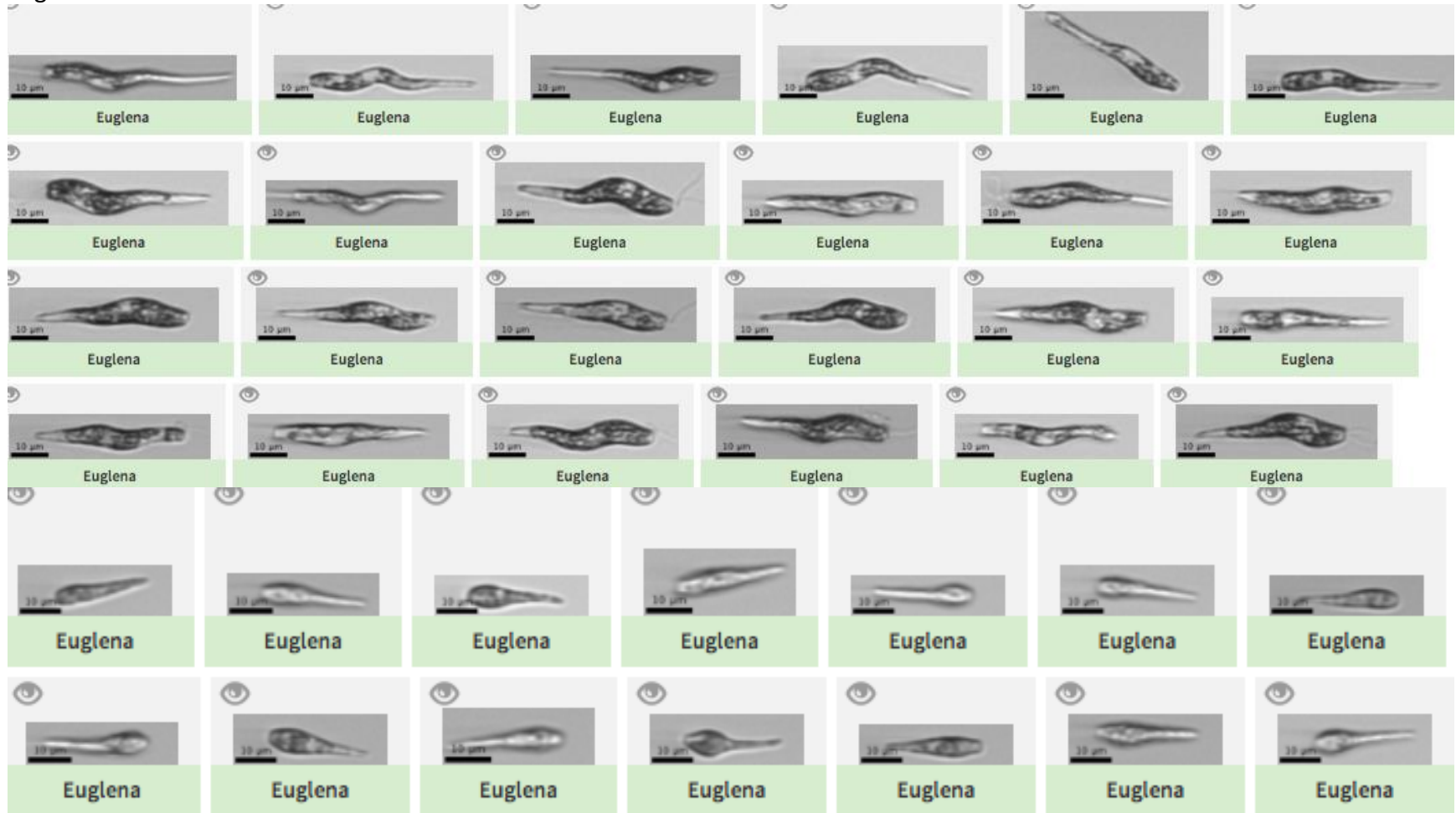


Warnowia

Dinoflagellates – Unidentifiable (classify as Dinophyceae)

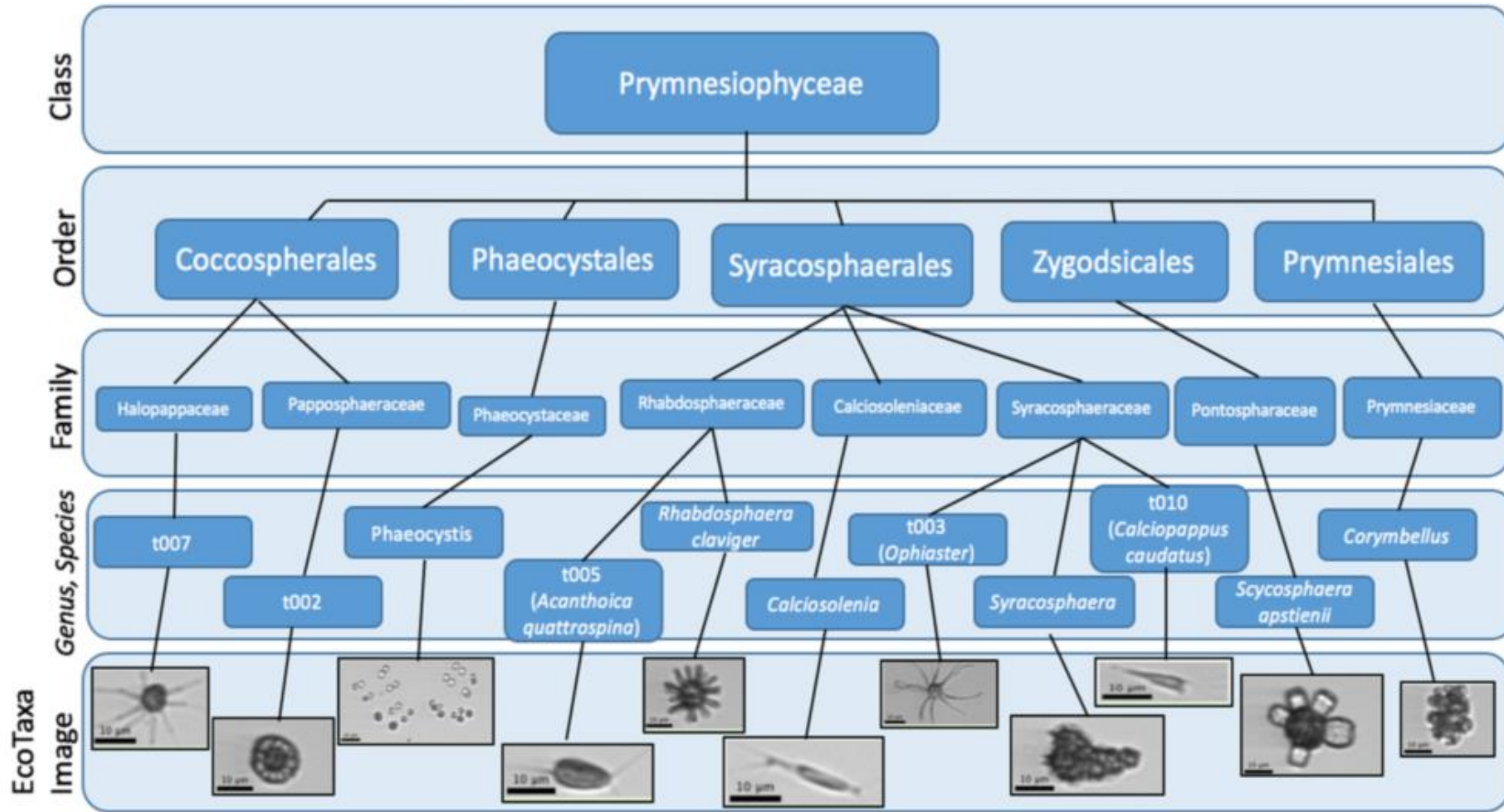


Euglenida



Prymnesiophytes:

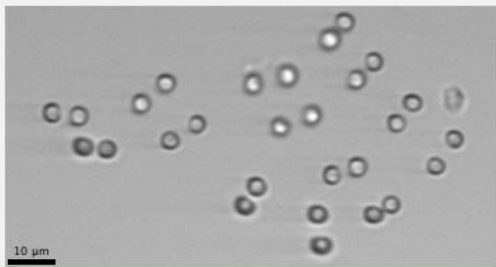
NOTE: Prymnesiophytes can difficult to classify. Often we see images that we can only classify to an order or family level on EcoTaxa. Below is a diagram showing the diversity among prymnesiophytes we see.



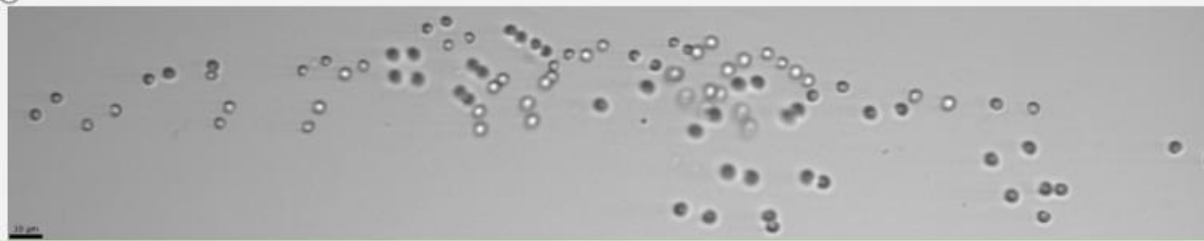
Prymensiophyceae



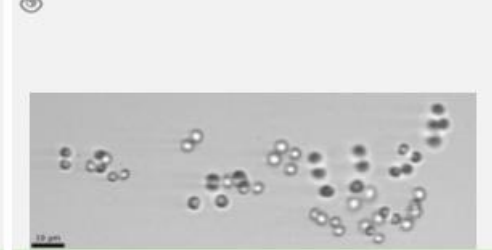
Prymnesiophyceae – *Phaeocystis*



Phaeocystis

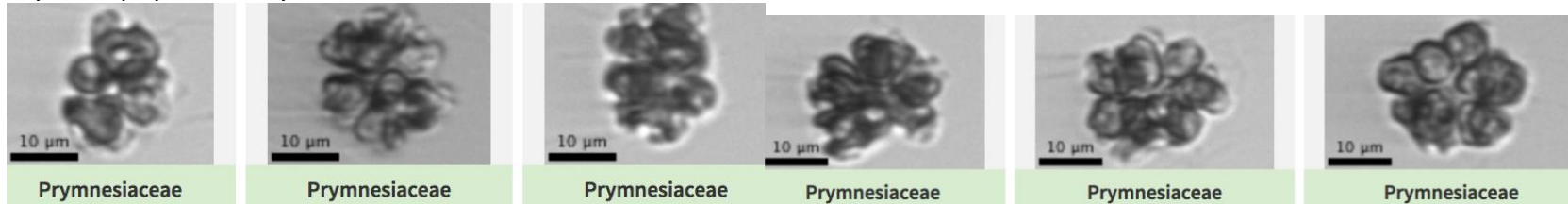


Phaeocystis

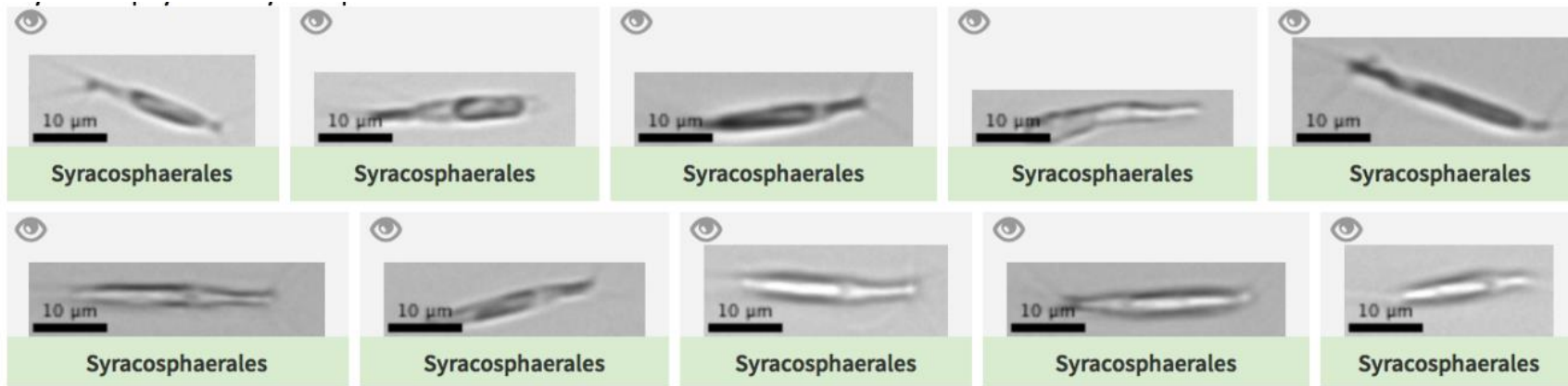


Phaeocystis

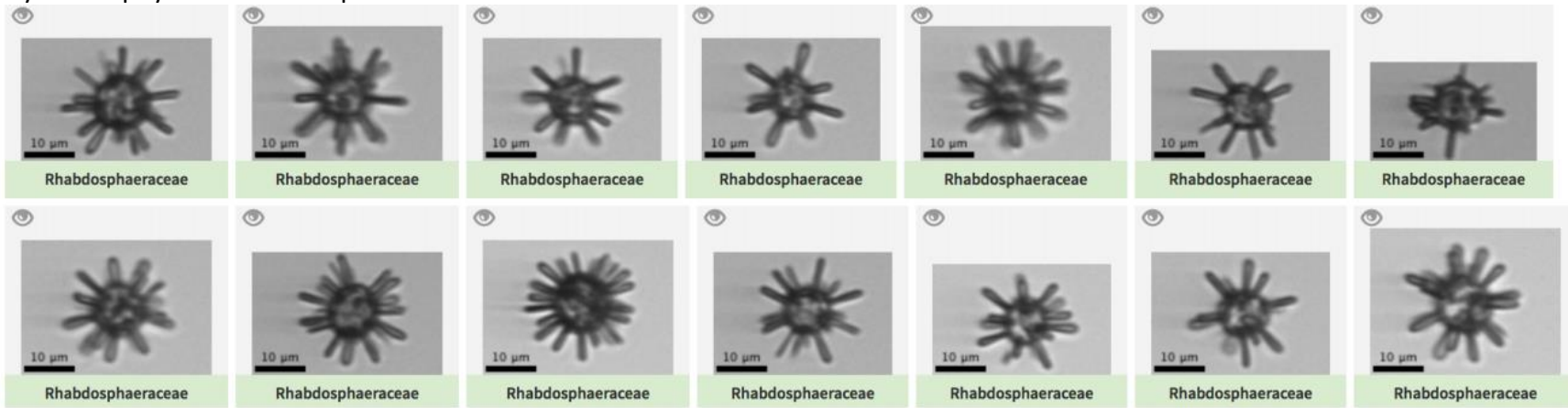
Prymensiphyceae – Prymnesiaceae



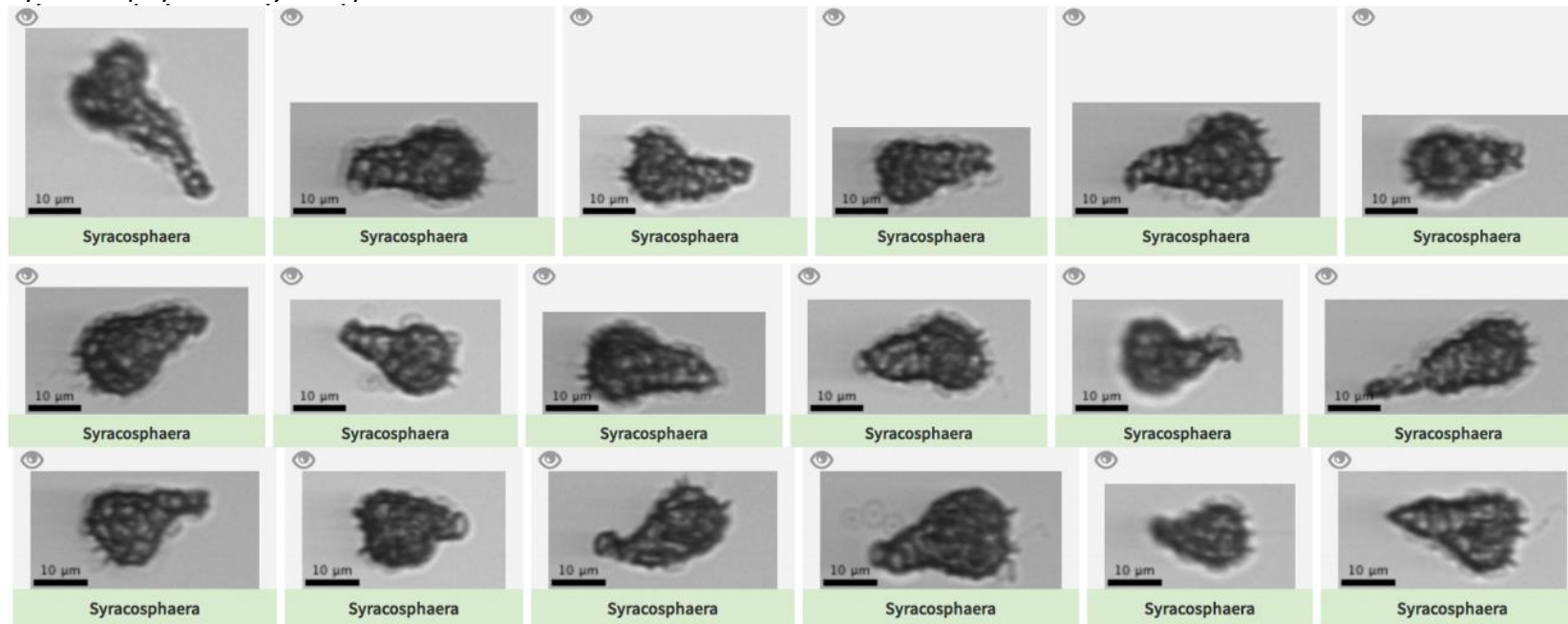
Prymnesiophyceae - Syracosphaerales



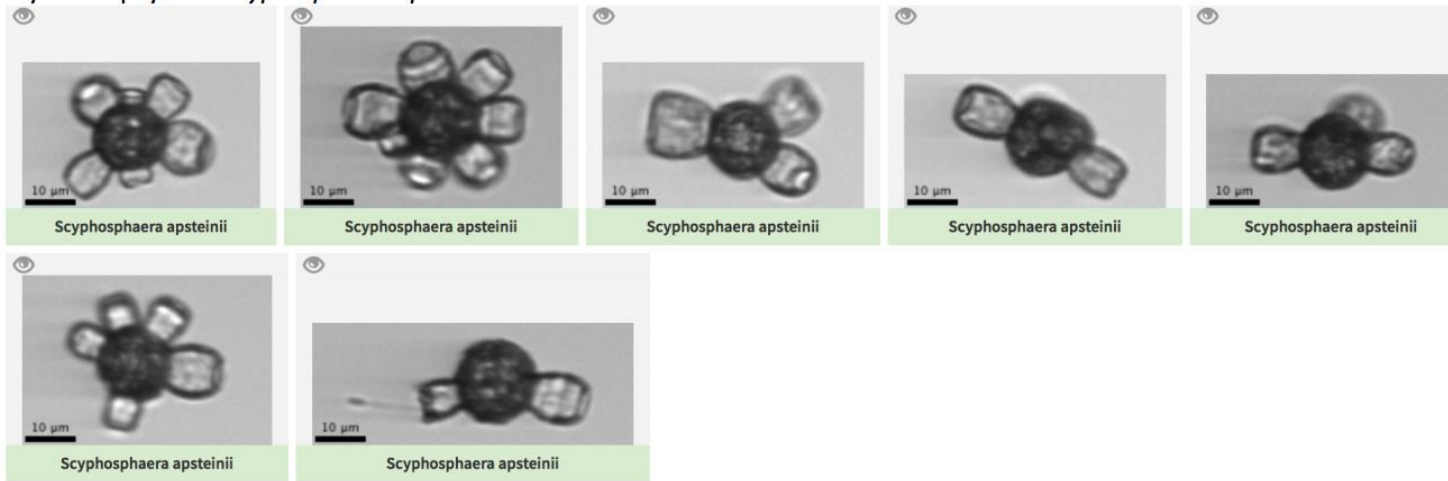
Prymnesiophyceae -Rhabdosphaeraceae



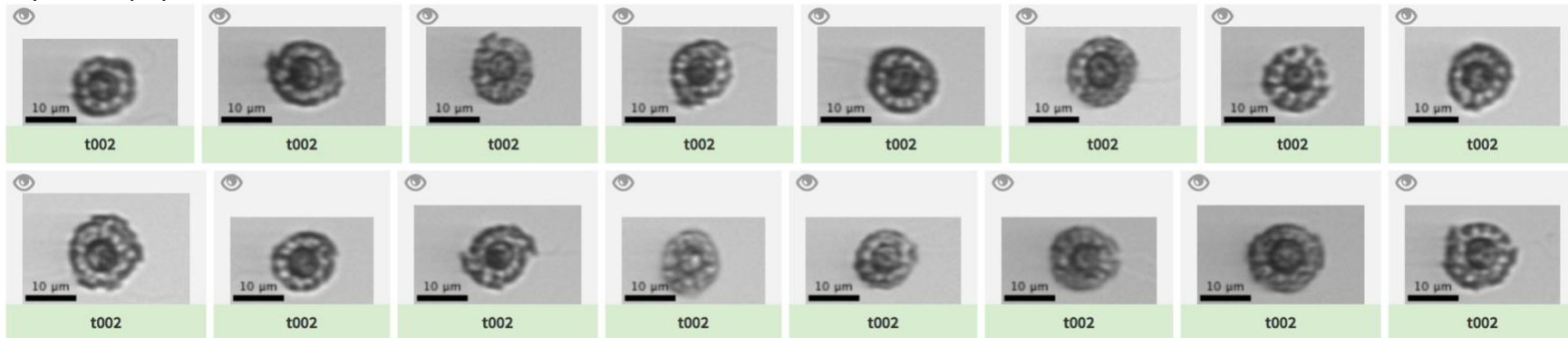
Prymnesiophyceae – *Syracosphaera*



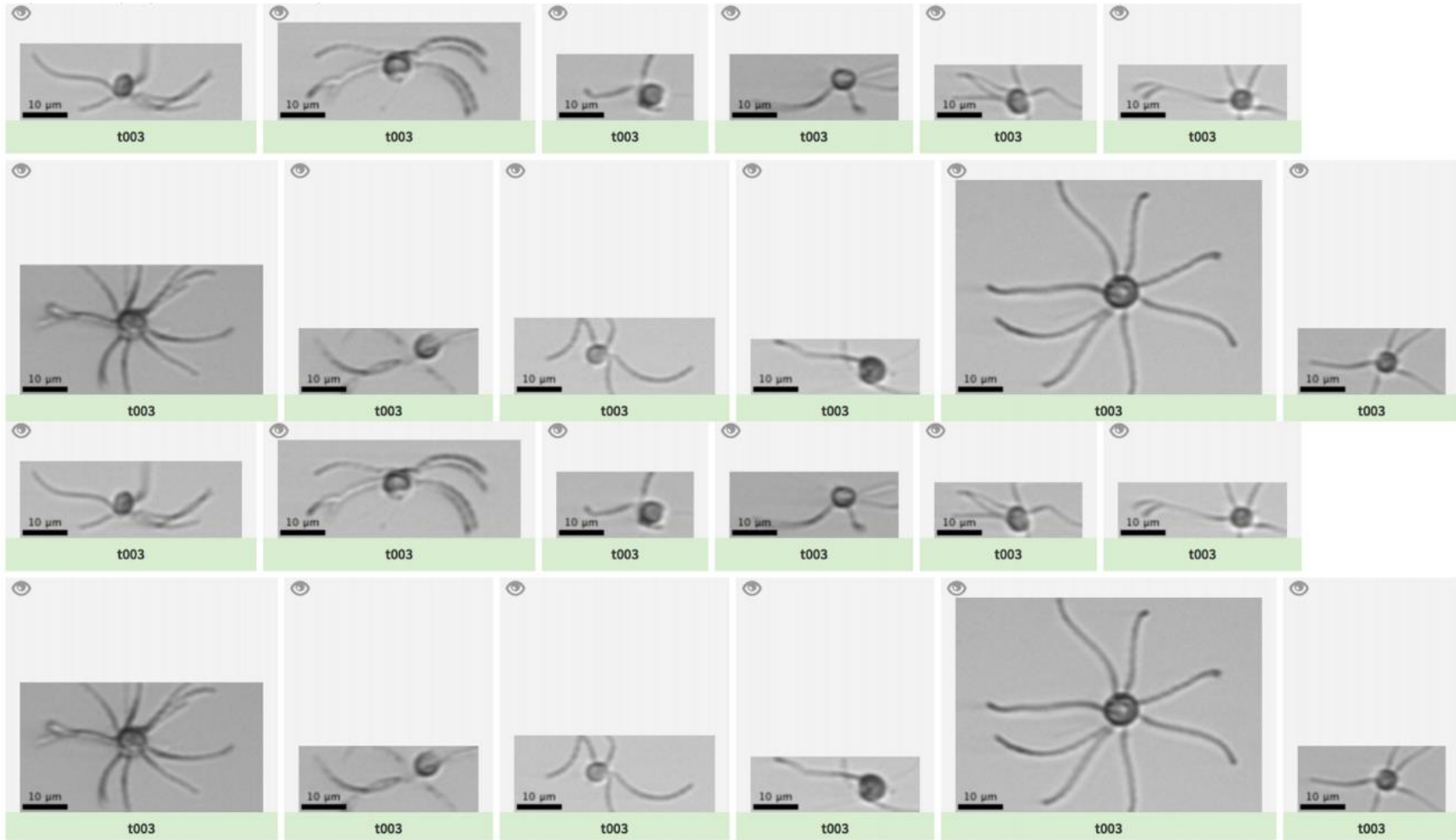
Prymensiophyceae – *Scyphosphaera apsteinii*



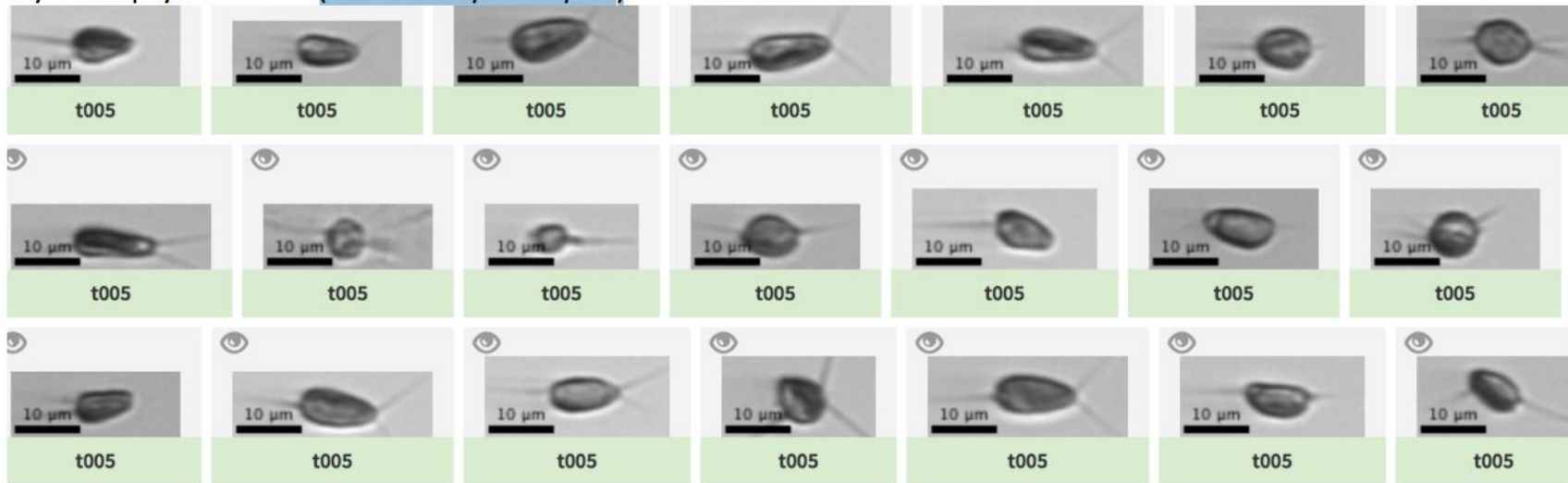
Prymensiophyceae – t002



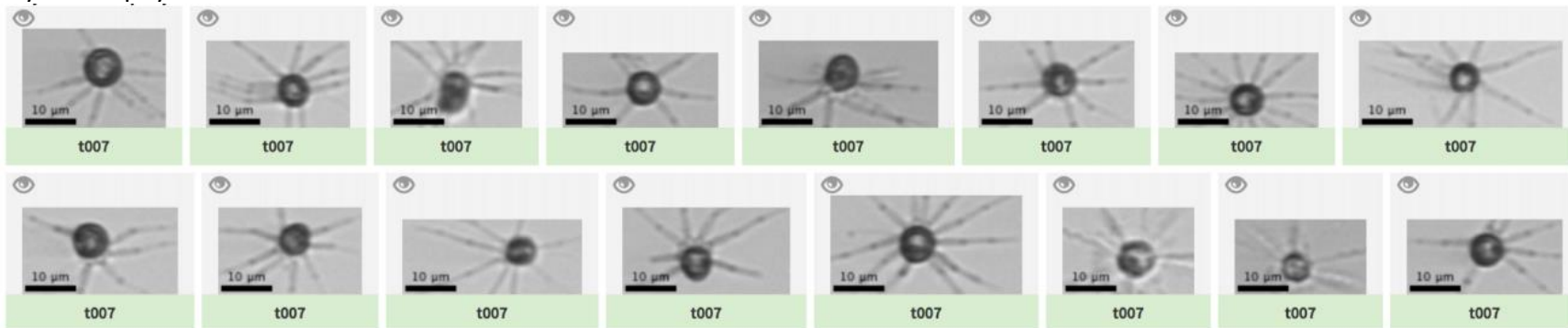
Prymnesiophyceae – t003



Prymnesiophyceae – t005 (*Acanthoica quattropsina*)



Prymnesiophyceae – t007

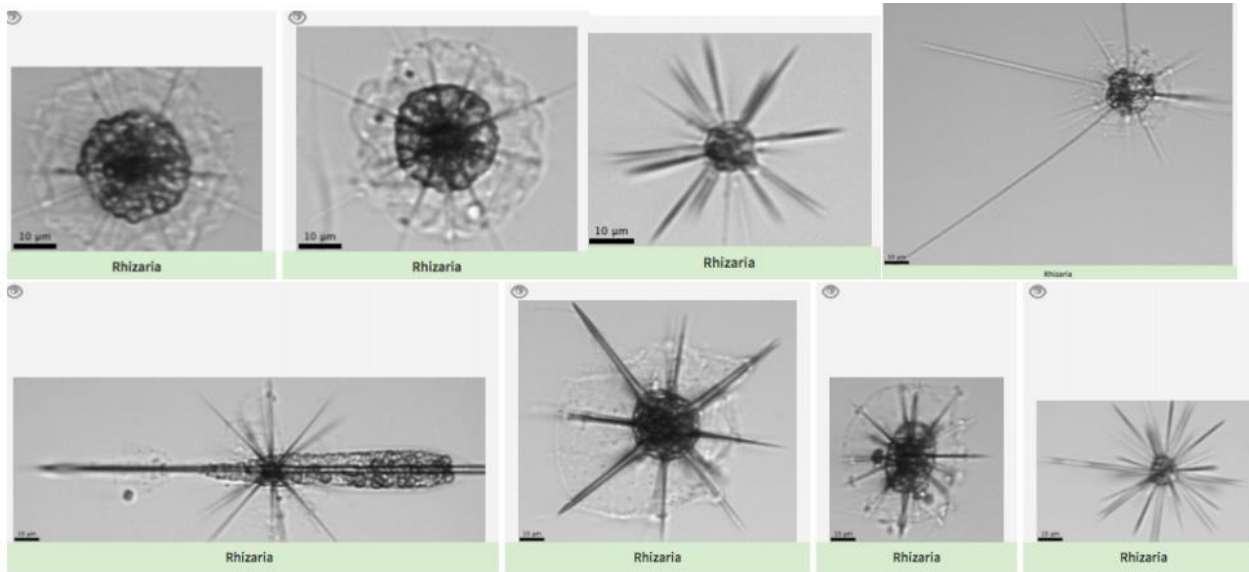


Prymnesiophyceae – t010 (*Calciopappus caudatus*)

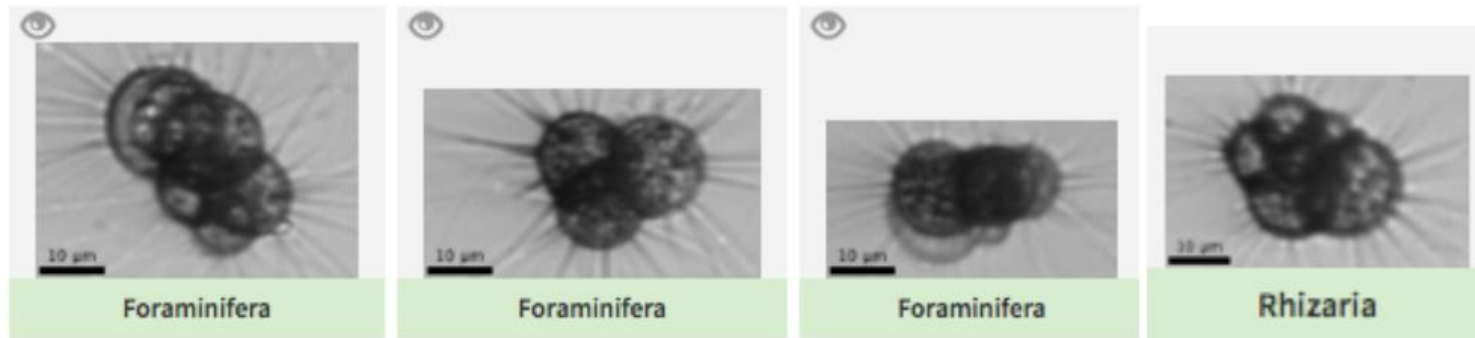


Rhizaria - includes subcategories of Radiolarians and Foraminifera; when in doubt classify to Rhizaria

Radiolarians:



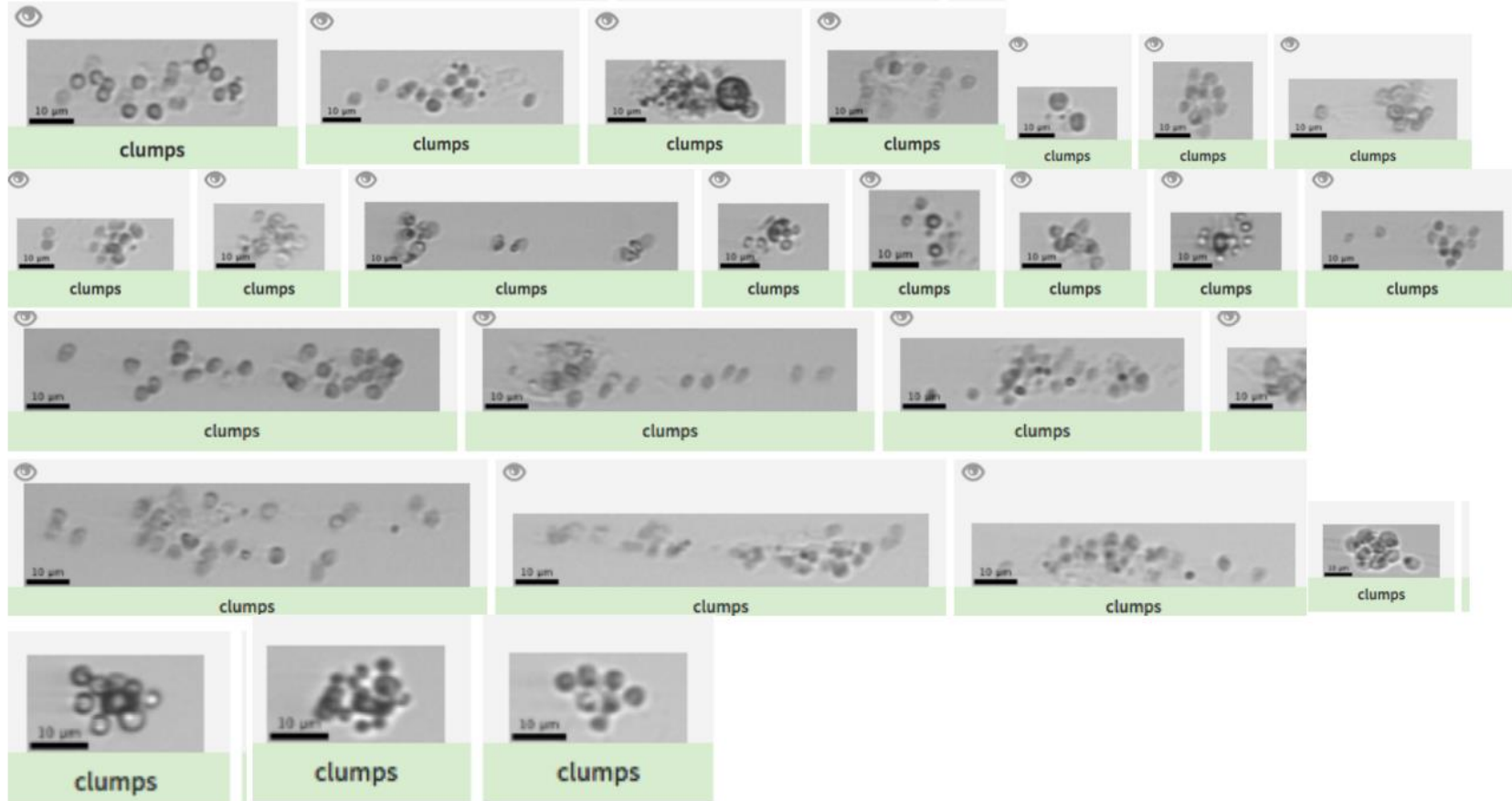
Foraminifera:



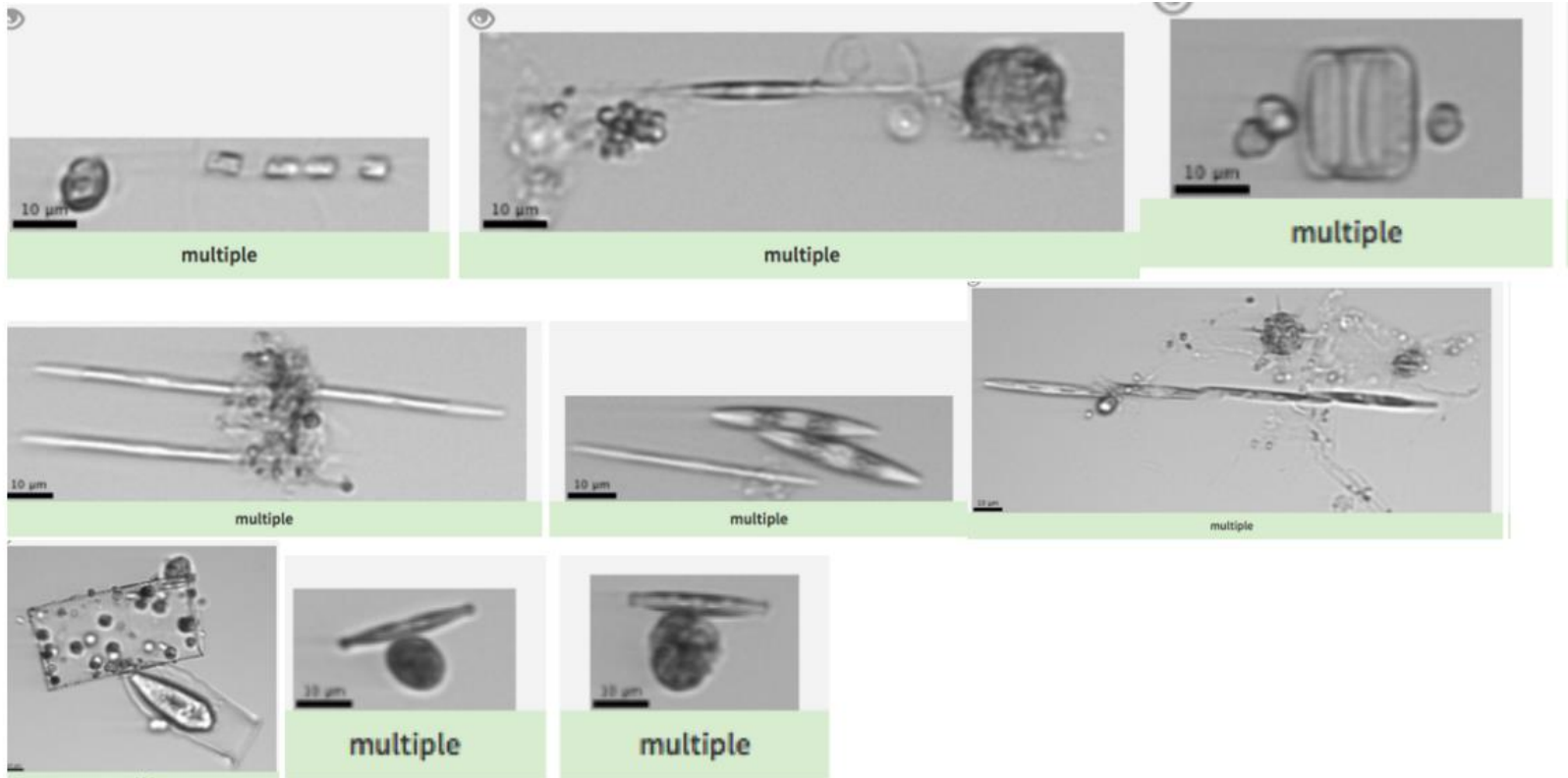
Other – Living, Unidentifiable



Other – Living, Clumps (Mostly homogenous/uniform)



Other – Living, Multiple (Clearly living cells of multiple types in one image)



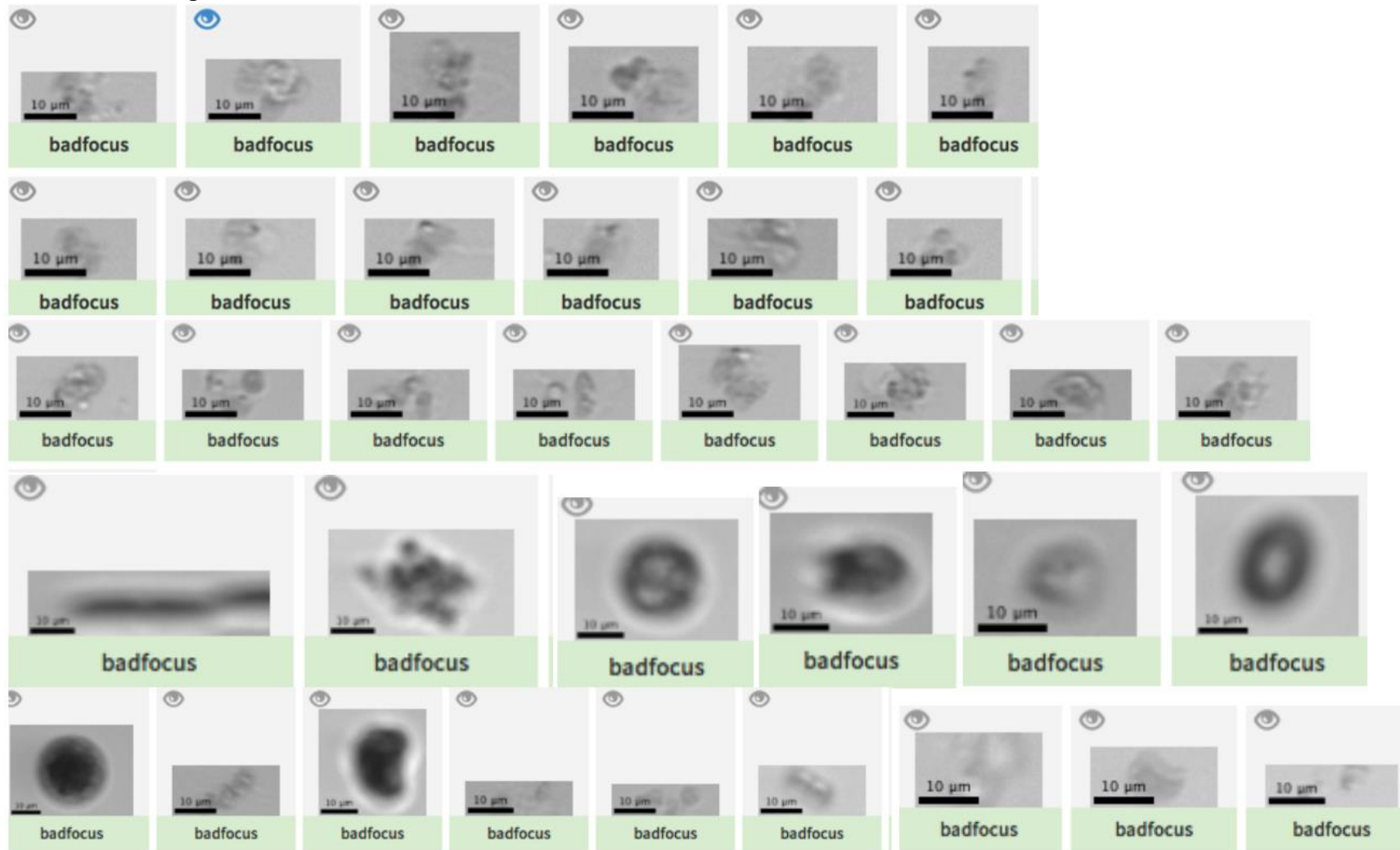
Other – Living, Part



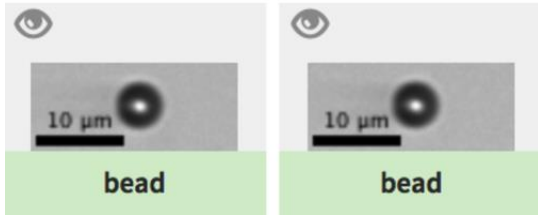
Other - Non-Living, Artifact (Unusual features, not images of any types of cell or particle)



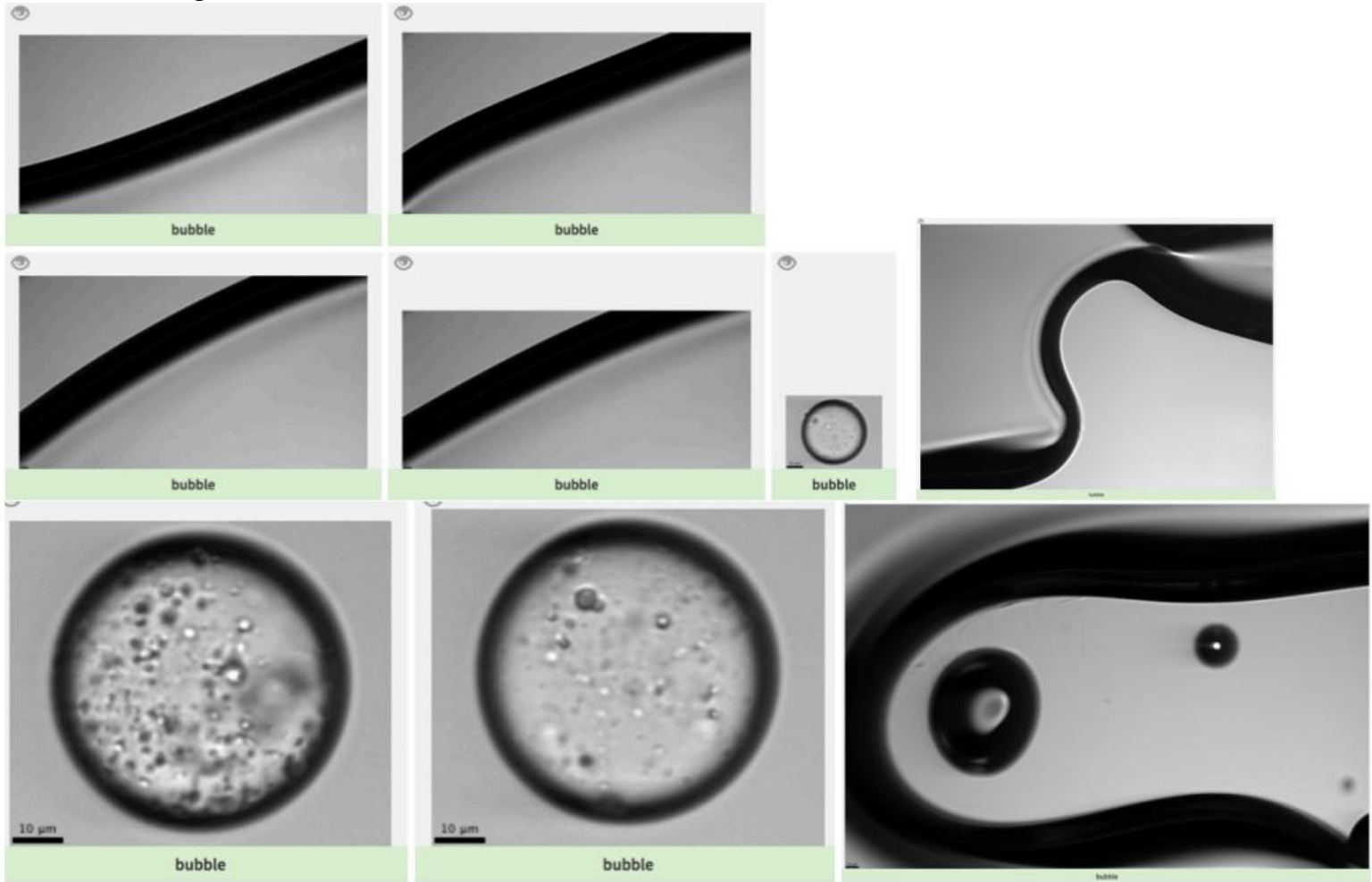
Other - Non-Living, Bad Focus



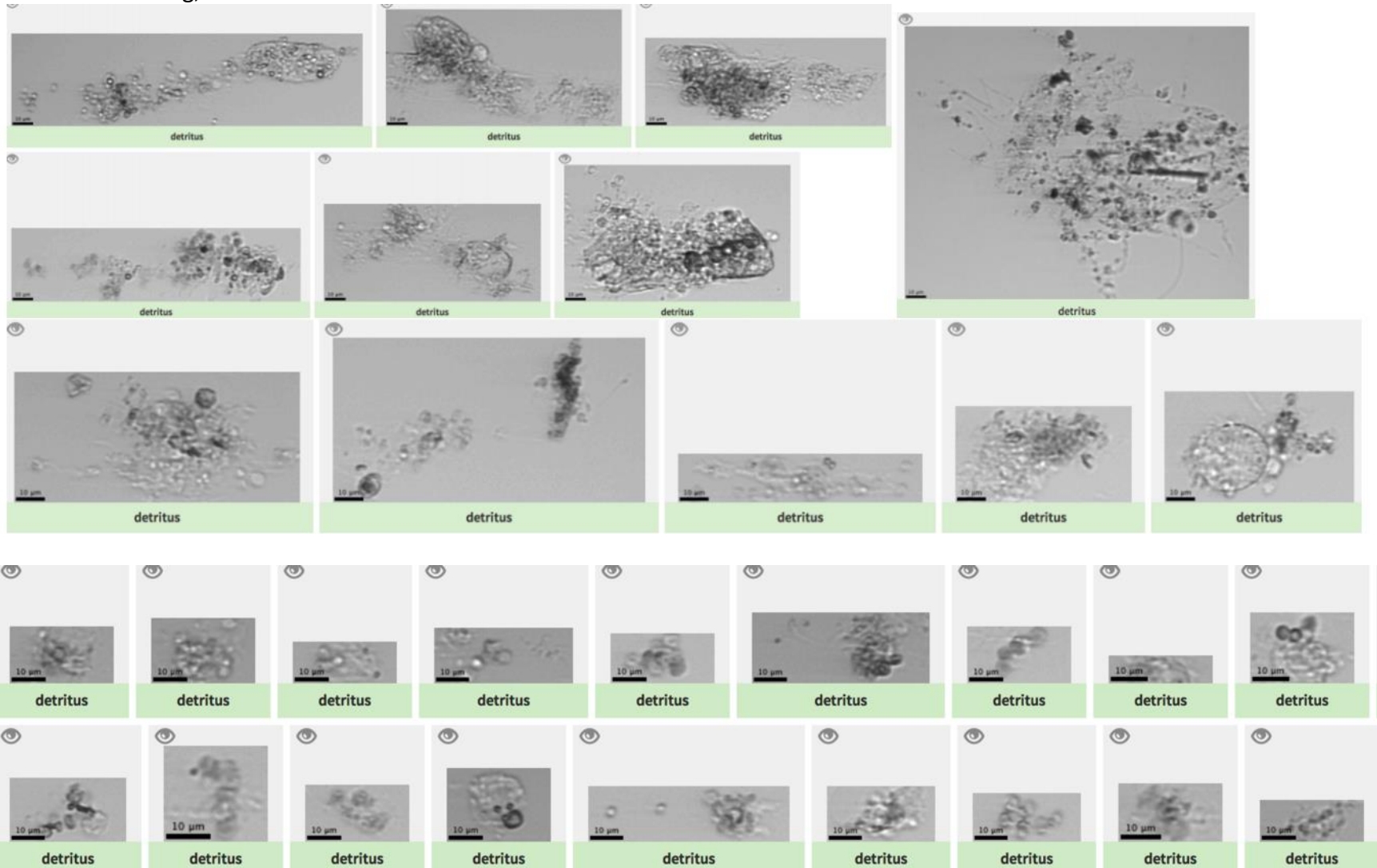
Other - Non-Living – Bead



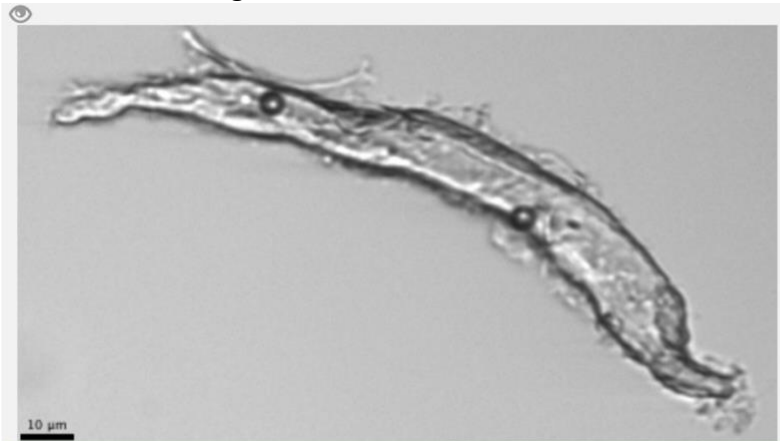
Other – Non-Living, Bubbles



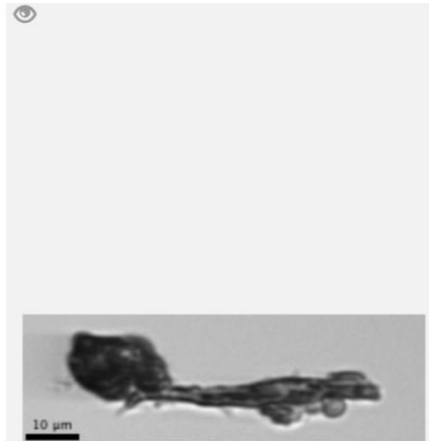
Other – Non-Living, Detritus



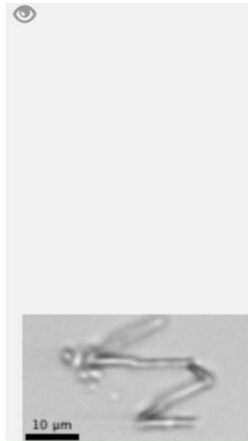
Other – Non-Living, Fiber



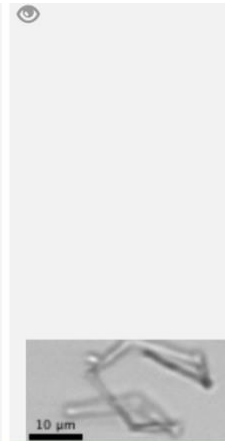
fiber



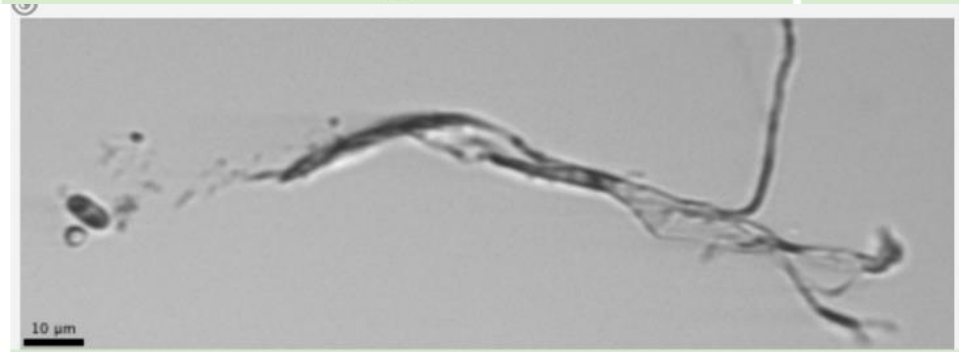
fiber



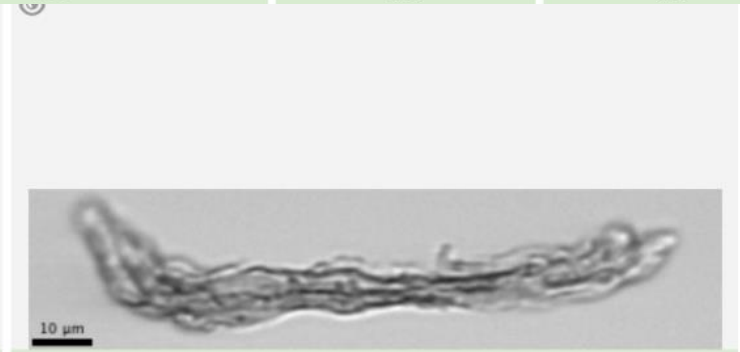
fiber



fiber

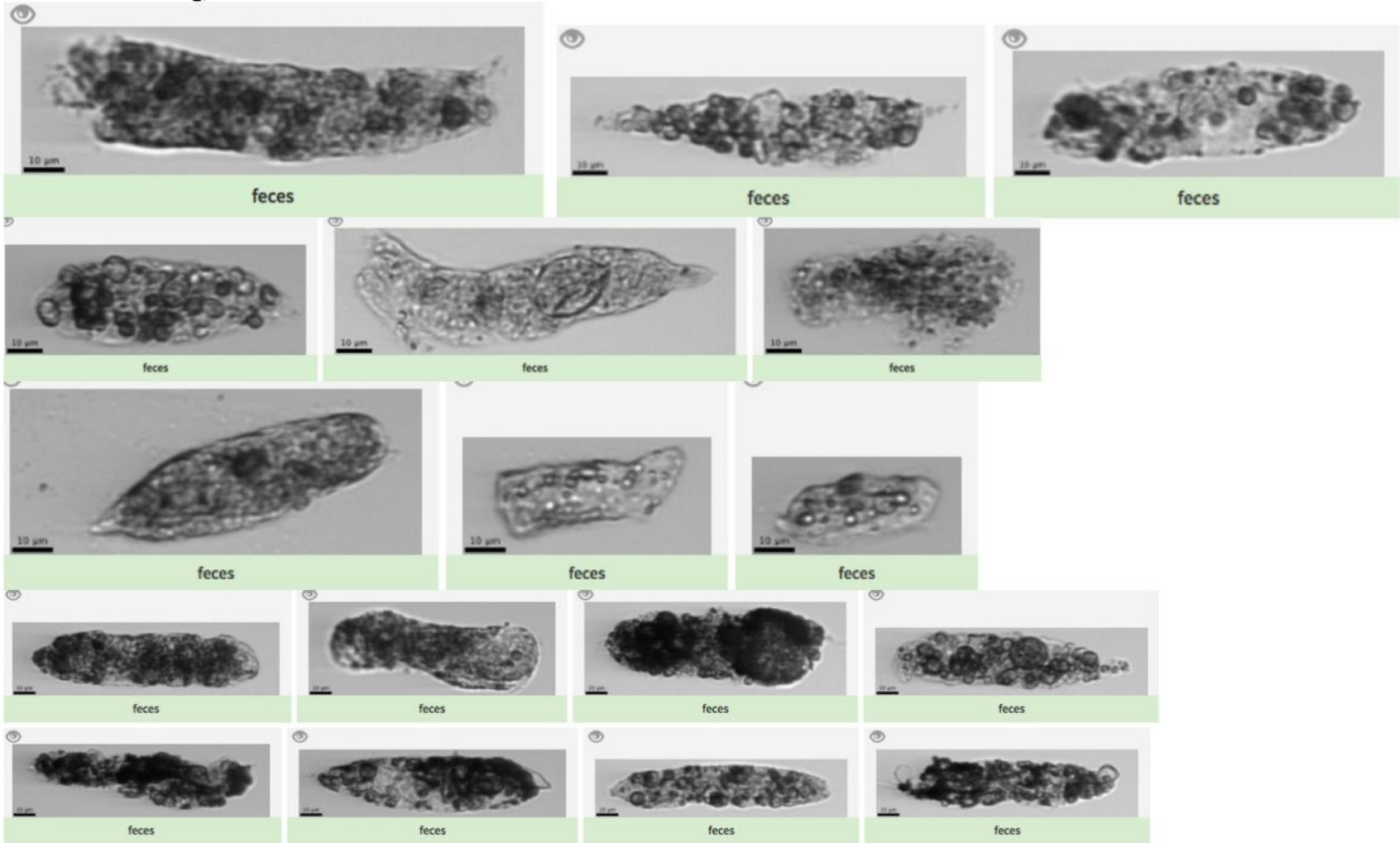


fiber

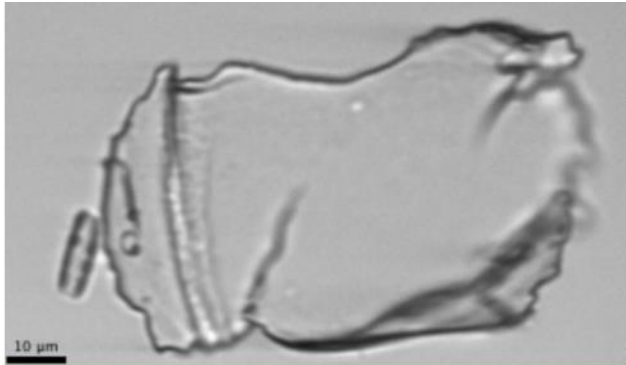


fiber

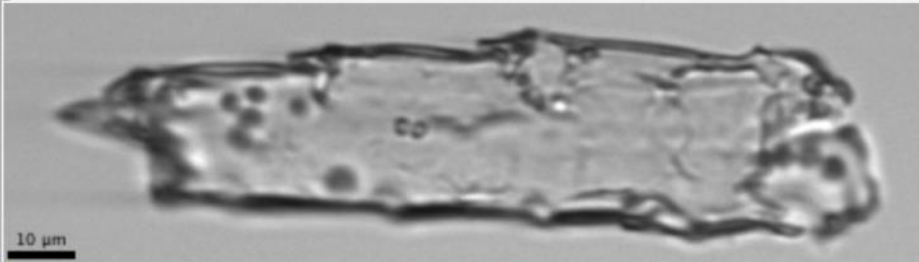
Other – Non-Living, Feces



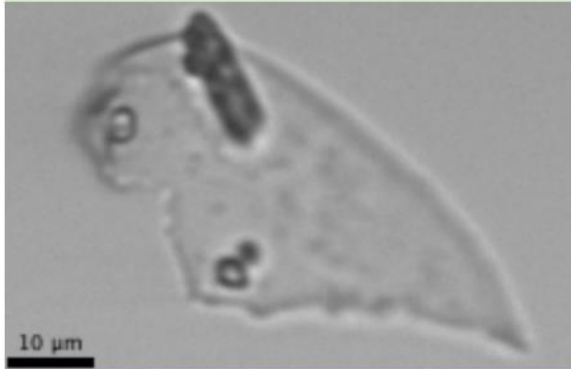
Other – Non-Living, Plastic



plastic

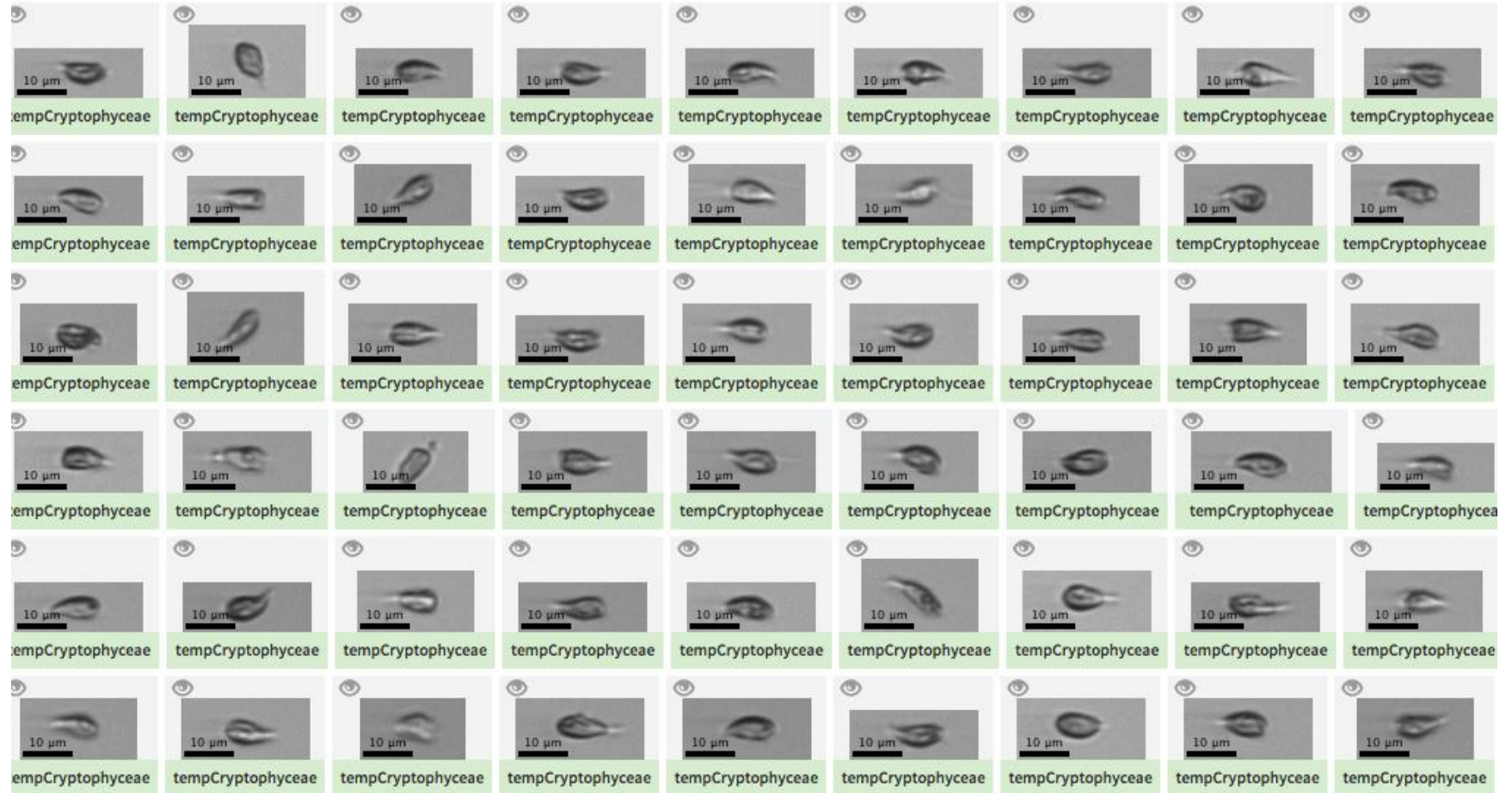


plastic



plastic

tempCryptophyceae



tempflagellates

