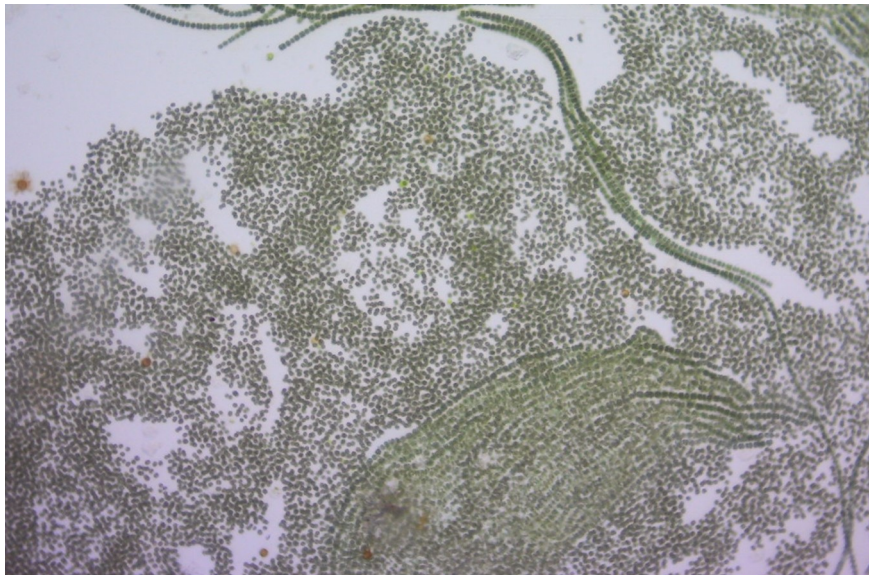
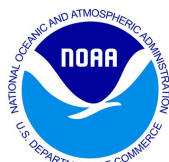


# Basic Cyanobacteria ID Guide



Jen Maucher Fuquay  
Phytoplankton Monitoring Network



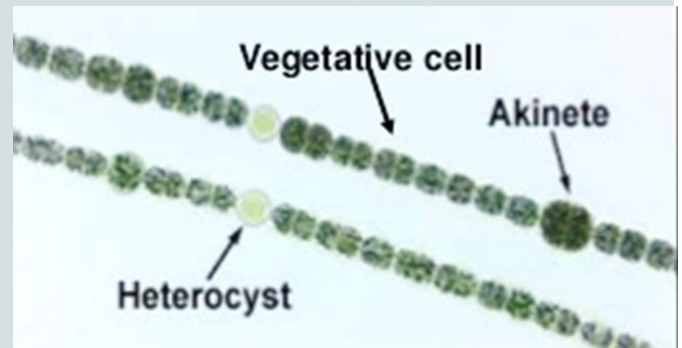
# DEFINITIONS

## Cyanobacteria anatomy

**Aerotop**- gas vacuoles found in some cyanobacteria. Allow for change in position in water column based on light level and photosynthesis. Appear as clear refractive clusters with irregular outlines in vegetative cells. Best viewed with bright field microscopy.



**Akinete**– specialized cells for survival of adverse environmental conditions; resting stage. Can germinate into viable vegetative cells when conditions improve. Akinetes are thick walled and appear granular.



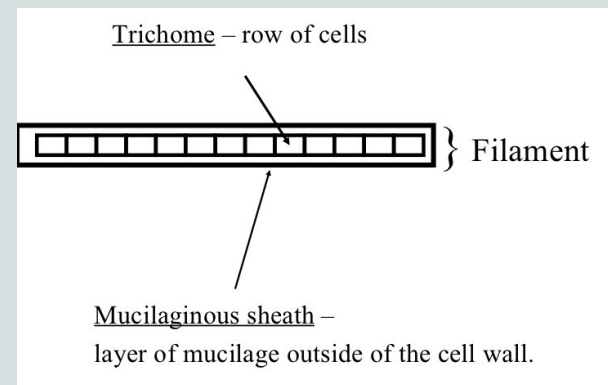
**Heterocyte (heterocyst)**- site of nitrogen fixation. Non-vegetative cells that are transparent and have thick walls which may give 'halo' like appearance.

**Vegetative cell**- somatic (non-reproductive) cell

**Trichome**– filamentous row of cells (no sheath present).

**Filament**– trichome and sheath

**Sheath**– a mucilaginous outer layer that encapsulates entire trichome

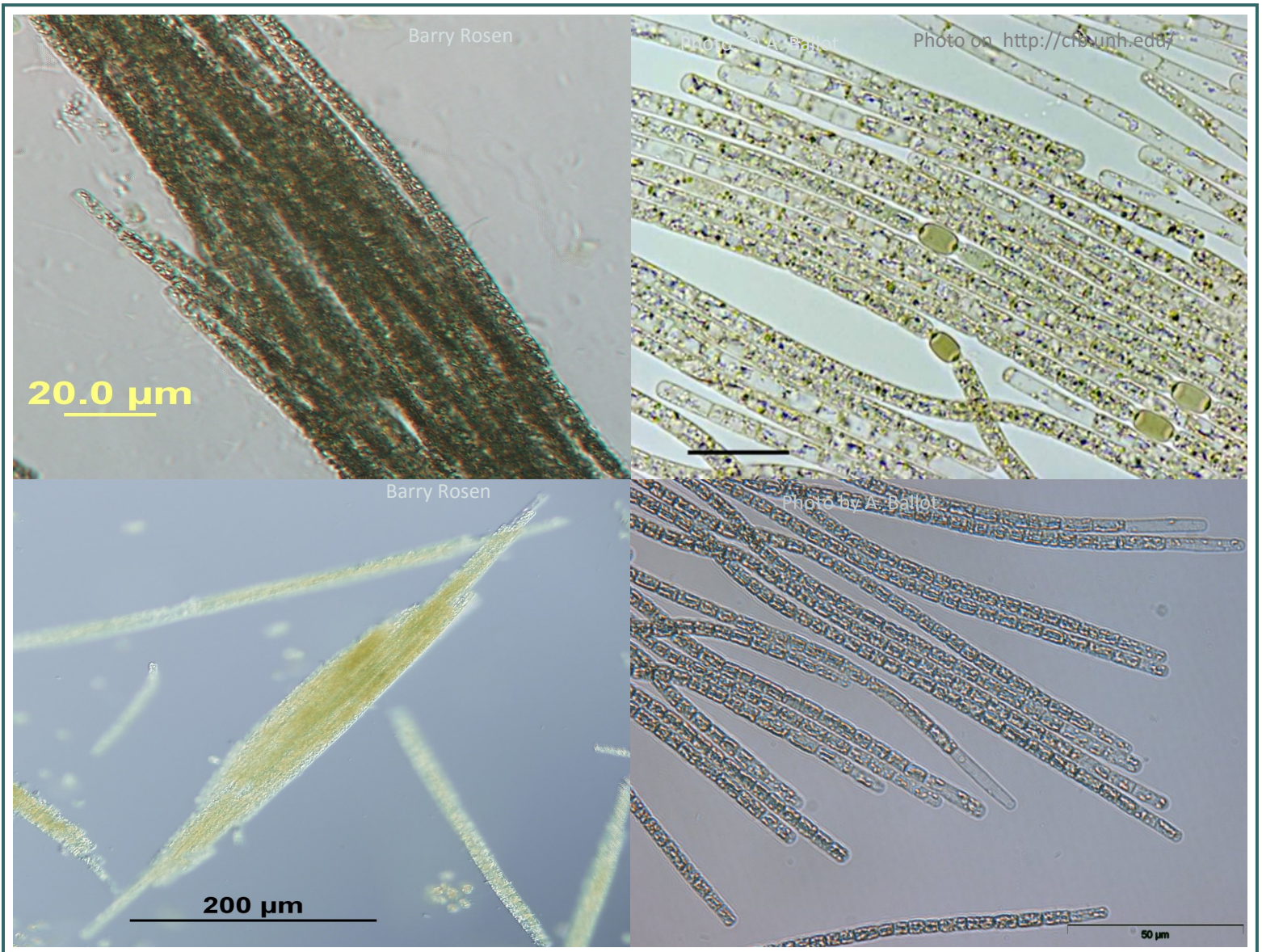


**Intercalary**– in between other cells i.e. not at terminal end of trichome

**Facultative**– optional or discretionary e.g. some cyanobacteria may or may not have aerotopes at any given time in their life cycle.

# APHANIZOMENON

## General Characteristics



Straight, unbranched trichomes

Trichomes tend to be in parallel bundles

(AKA 'grass clippings')

No sheath

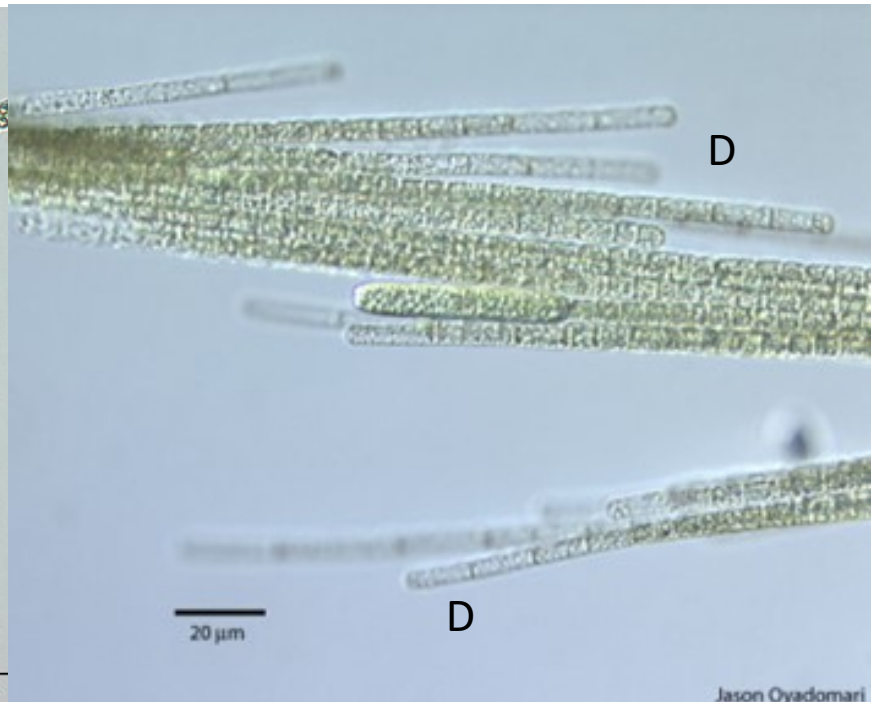
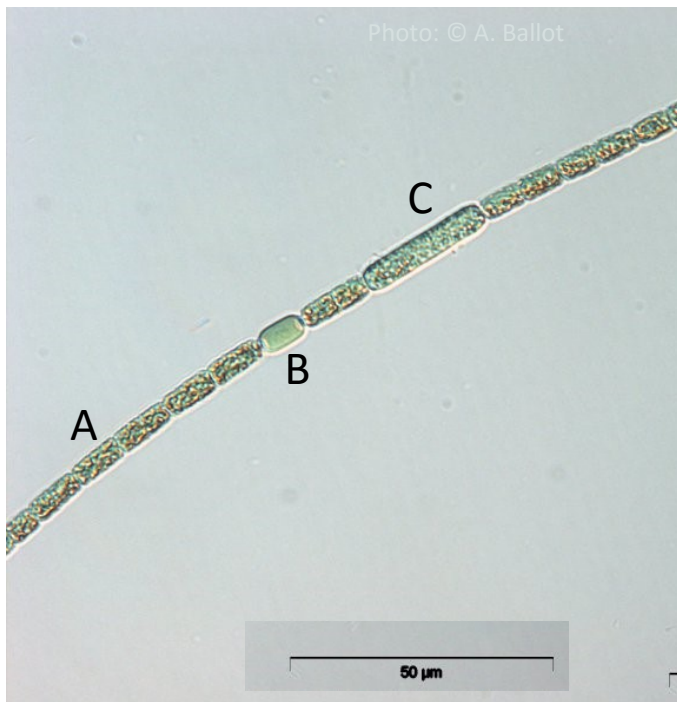
Order Nostocales

# APHANIZOMENON



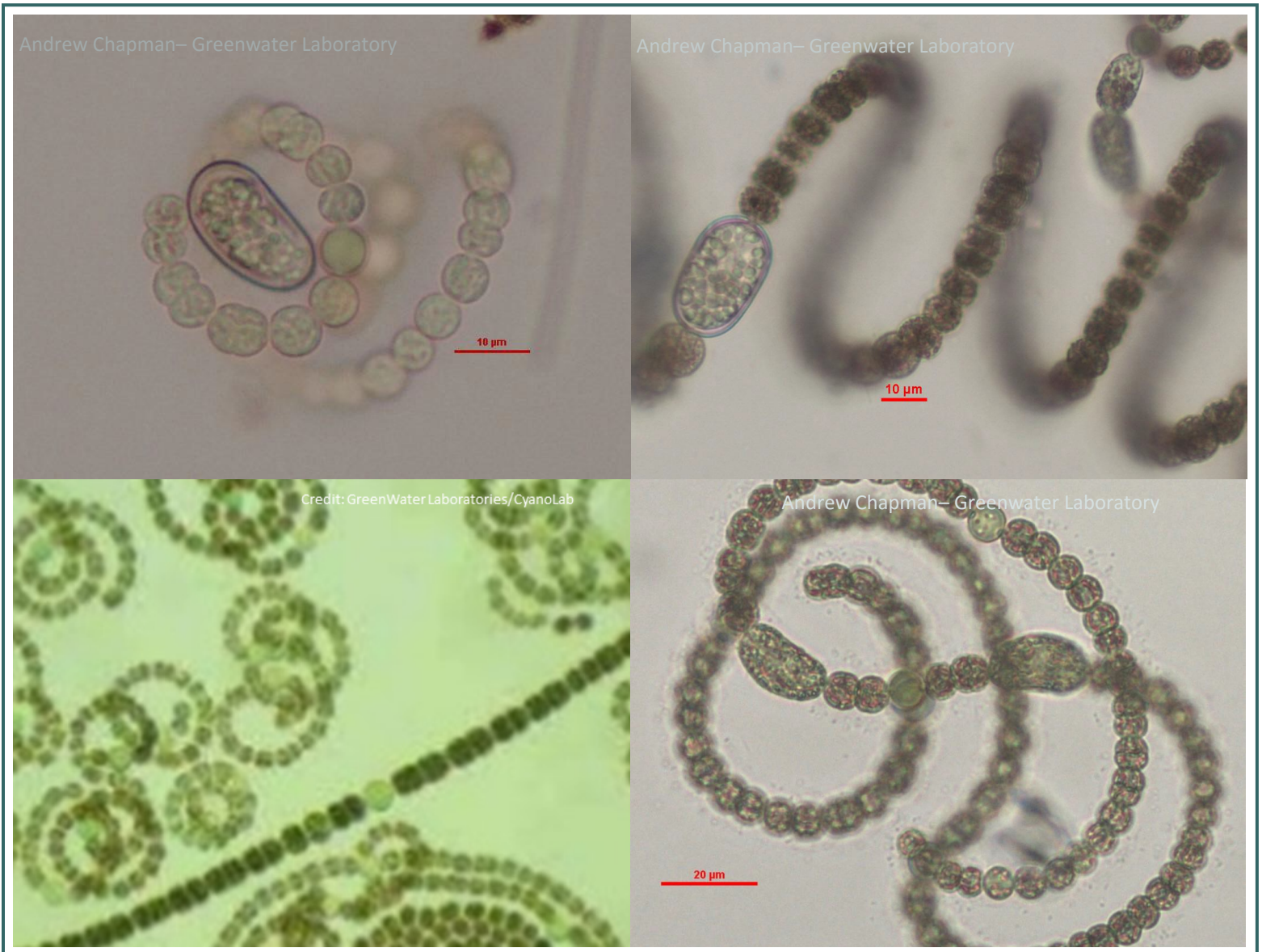
## Things to look for:

- A. Aerotopes (facultative)
- B. Heterocytes are intercalary (facultative)
- C. Akinetes usually cylindrical and intercalary
- D. Terminal ends are elongated and may be “empty” looking



# DOLICHOSPERMUM

(formerly *Anabaena*)



Unbranched trichomes

Trichomes can be straight, coiled or curvy

End cells look similar to other vegetative cells

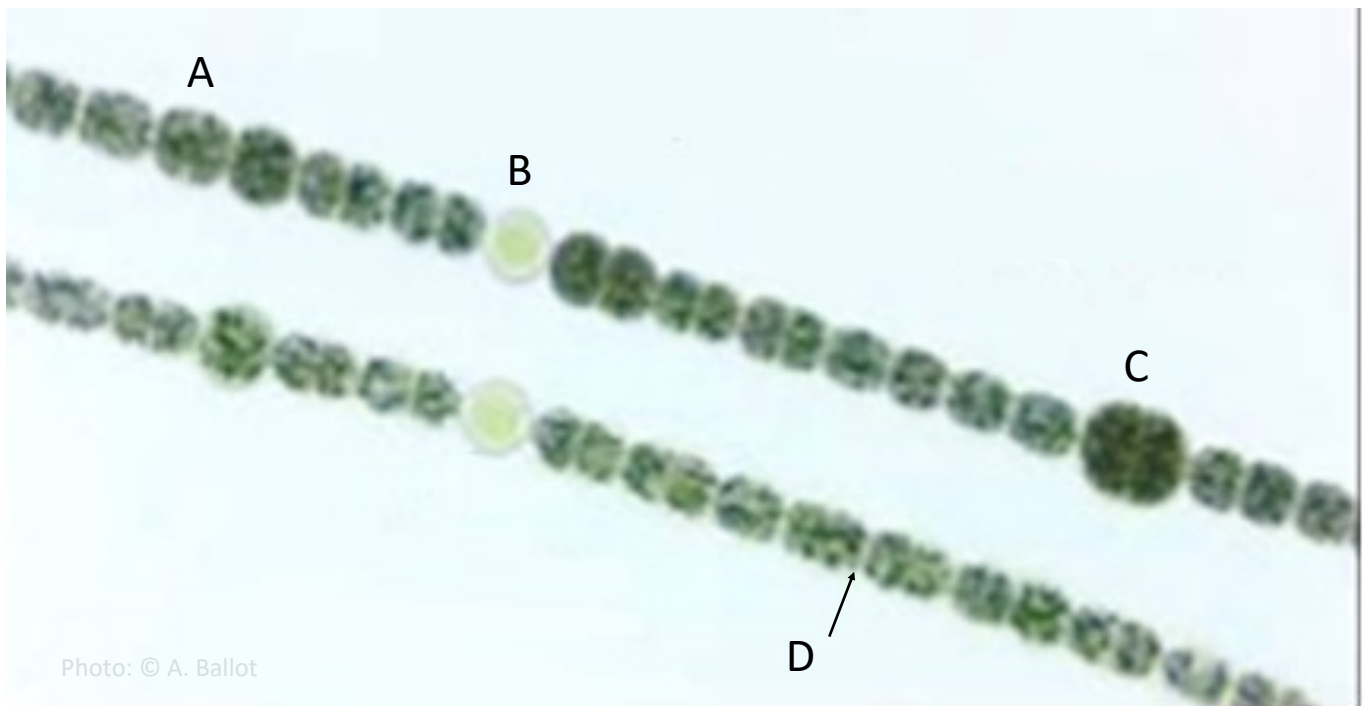
Order Nostocales

# DOLICHOSPERMUM



## Things to look for:

- A. Cells rounded or barrel shaped with aerotopes
- B. Heterocytes are intercalary
- C. Akinetes are intercalary
- D. Cells constricted at cross walls



# RAPHIDIOPSIS

## General Characteristics



Unbranched trichomes

Trichomes can be straight, coiled or curvy

Heterocytes **ALWAYS** terminal

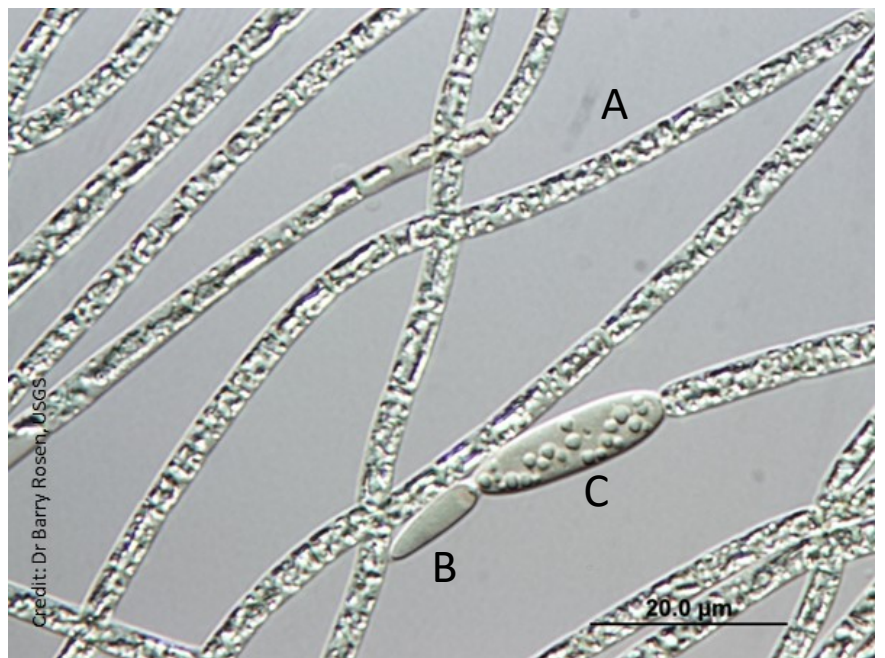
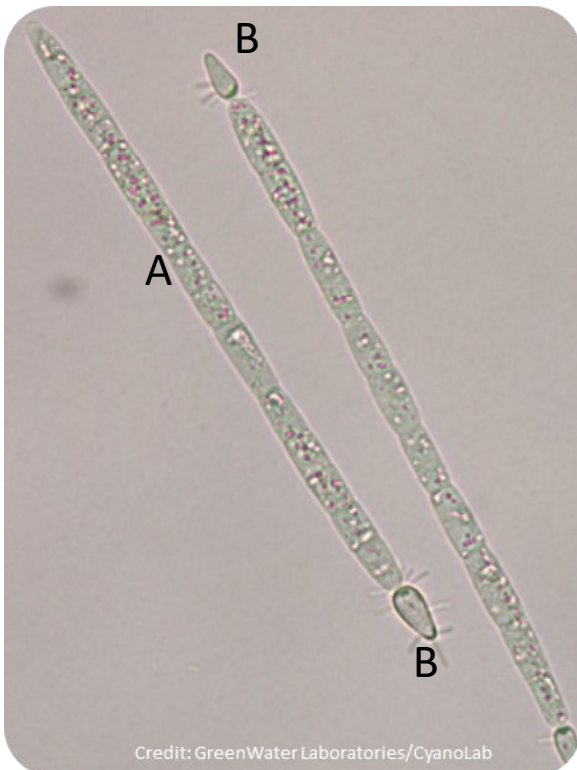
Order Nostocales

# RAPHIDIOPSIS



## Things to look for:

- A. Cells cylindrical with aerotopes (facultative)
  - B. Heterocytes (when present) are always terminal at one or both ends
  - C. Akinetes (when present) usually 1-3 cells back from heterocytes
- Terminal cells attenuate (get narrower)
  - Difficult to ID when lacking heterocytes



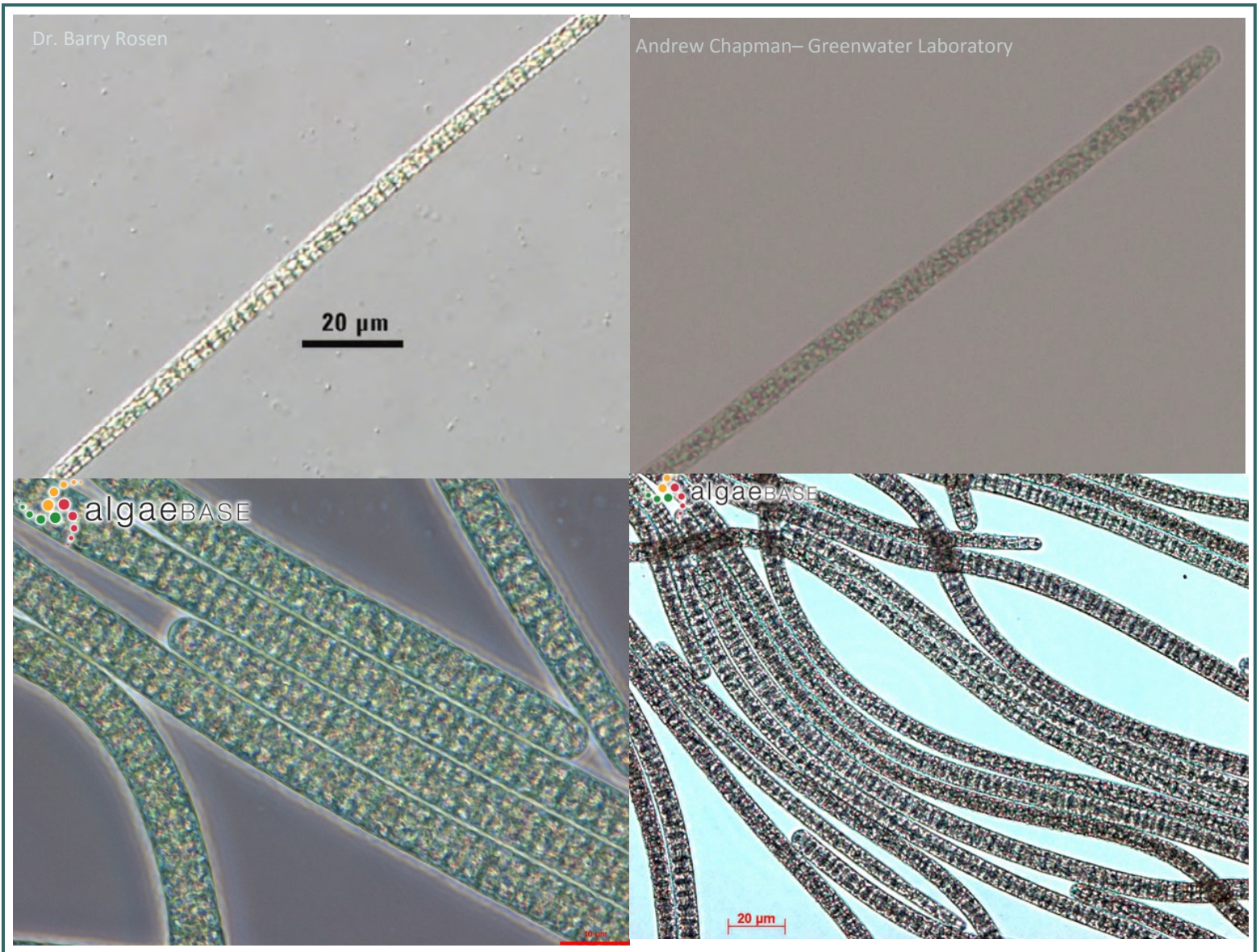


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# PLANKTOTHRIX

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Formerly *Oscillatoria*



Unbranched trichomes

Trichomes can be straight or wavy

NO heterocytes

NO akinetes

Order Oscillatoriales

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# PLANKTOTHRIX

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## Things to look for:

A. Cells mostly shorter than wide or isodiametric

B. LOTS of aerotopes throughout cells

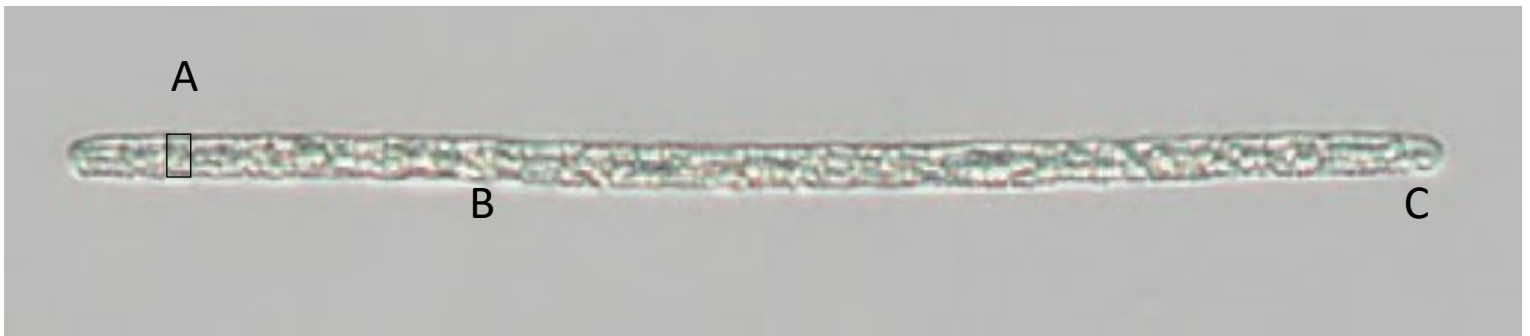
Terminal cells can be: C. narrowly conical

D. broadly rounded

or swollen (calyptrate)- not shown

- No heterocytes (not a N<sub>2</sub> fixer)

- No akinetes

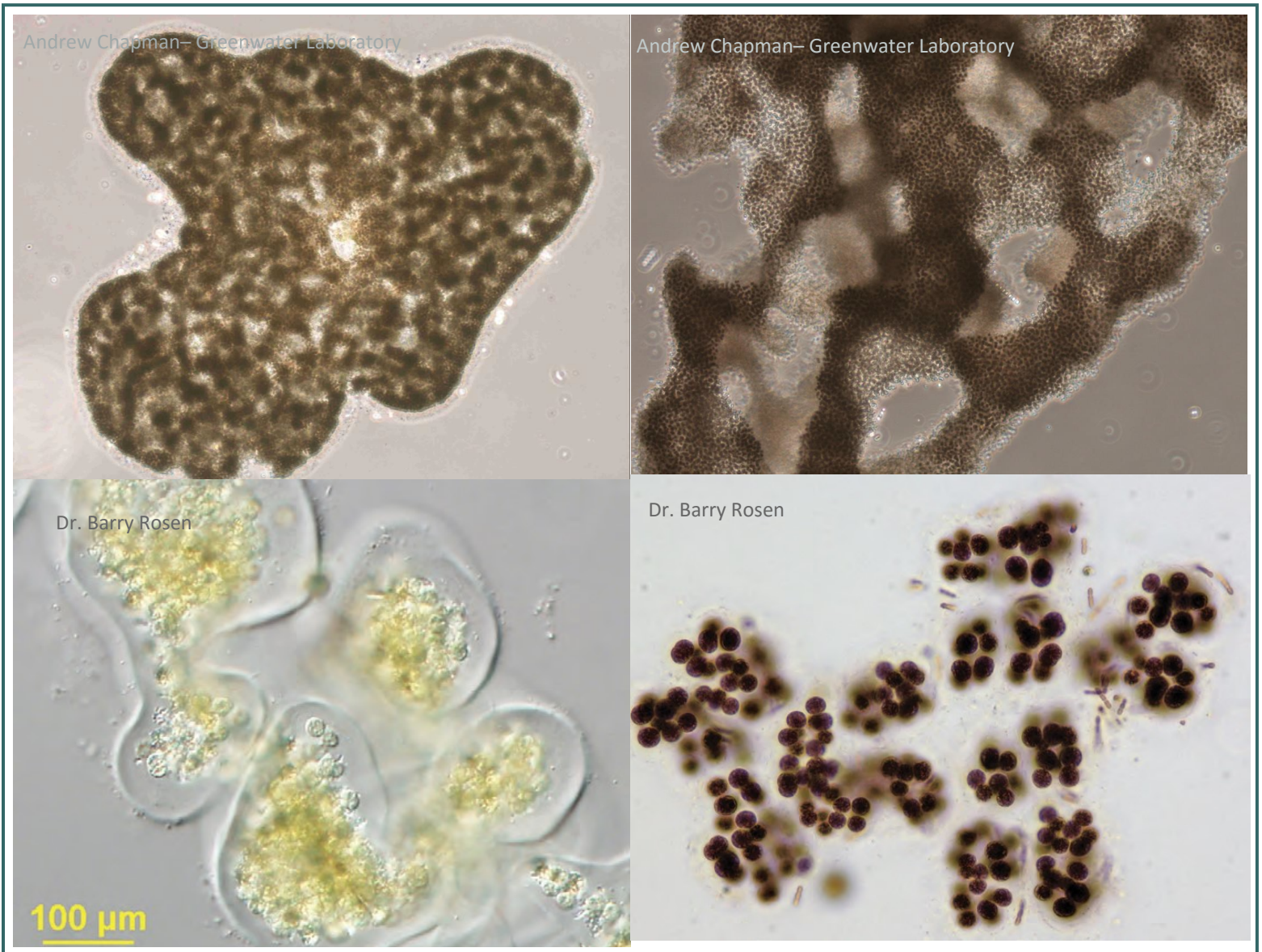


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# MICROCYSTIS

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## General Characteristics



Colonial

Colonies surrounded by mucilage

Shape of colony & mucilage can help to ID

NO heterocytes

NO akinetes

Order Choococcales

# MICROCYSTIS



## Things to look for:

A. Rounded cells with aerotopes

Cells in colony may be

A. loosely associated

B. clathrate

C. densely packed

Mucilage can vary in thickness

