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Differentiation of pseudo-nitzschia species (Baccillariophyceae) in seawater samples from the Salish Sea using the compound microscope

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DIFFERENTIATION OF PSEUDO-NITZSCHIA SPECIES IN SEAWATER SAMPLES FROM THE SALISH SEA USING THE COMPOUND MICROSCOPE

NICOLA HAIGH, DEVAN JOHNSON, AND TAMARA BROWN

SALISH SEA ECOSYSTEM CONFERENCE, Seattle, WA, April 4 – 6, 2018
OVERVIEW

- WHY
- HOW
- KEY
Routine phytoplankton sample analysis for monitoring programs is still done with the compound microscope.

There is a perception that differentiating between different *Pseudo-nitzschia* species using the light microscope is “impossible.”

Grouping *Pseudo-nitzschia* into a few easily-differentiated groups increases useful data from routine monitoring.

However: most *Pseudo-nitzschia* keys start with presence/absence of central interspace, which requires acid-cleaned material.
HOW: KEY FEATURES

- Cell size: cell length and width
- Cell shape
- Cell overlap in chains
- Visibility of interstriae ("stripes")
- Cell end shape
HOW: KEY FEATURES

- Cell size: cell length and width
HOW: KEY FEATURES

- Cell size: cell length and width
- Cell shape: valve view
HOW: KEY FEATURES

- Cell size: cell length and width
- Cell shape: valve view
- Cell overlap in chains
HOW: KEY FEATURES

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- Cell shape: valve view
- Cell overlap in chains
- Visibility of interstriae (“stripes”)
HOW: KEY FEATURES

- Cell size: cell length and width
- Cell shape: valve view
- Cell overlap in chains
- Visibility of interstriae (“stripes”)
- Cell end shape
HOW: KEY SPECIES

- *Pseudo-nitzschia pungens* group
- *P. delicatissima* group
- *P. australis*
- *P. seriata*
- *P. heimii*
- *P. fraudulenta*
Salish Sea Pseudo-Nitzschia Species Flowchart

Cell length <80um, width < 3um, chain overlap 1/5 - 1/10

- NO
- YES
  - Cell asymmetrical in valve view
    - NO
      - P. pungens group
    - YES
      - P. australis / seriata group

- YES
  - P. delicatissima group
SIMPLE 3 GROUPS

**SALISH SEA PSEUDO-NITZSCHIA SPECIES FLOWCHART**

- **Cell length < 80um, width < 3um, chain overlap 1/5 - 1/10**
  - **NO**
  - **YES**: *P. delicatissima group*
- **Cell asymmetrical in valve view**
  - **NO**: *P. pungens group*
  - **YES**: *P. australis / seriata group*
KEY – SIMPLE 3 GROUPS

SALISH SEA PSEUDO-NITZSCHIA SPECIES FLOWCHART

Cell length < 80um, width < 3um, chain overlap 1/5 - 1/10

- Cell asymmetrical in valve view
  - NO
  - YES: P. delicatissima group

- P. pungens group
- P. australis / seriata group
KEY – A FEW MORE SPECIES

SALISH SEA PSEUDO-NITZSCHIA SPECIES FLOWCHART

- Cell length <80um, width < 3um, chain overlap 1/5 - 1/10
  - NO
  - YES
    - Cell asymmetrical in valve view
      - NO
      - YES
        - Interstriae visible @100X, chain overlap 1/3 - 1/4
          - YES
          - NO
            - Cell ends blunt and rostrate
              - NO
              - YES
                - P. australis
              - P. seriata
            - P. heimii
        - P. delicatissima group
  - P. fraudulenta
    - Interstriae visible @100X
      - Chain overlap 1/3 - 1/4, cell ends sharp
        - NO
        - YES
          - P. pungens group
          - Pseudo-nitzschia sp.
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