Issues in Periphyton Taxonomic Consistency

Diane Winter

Rhithron Associates, Inc.
Missoula, MT

www.wordle.net

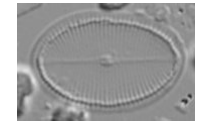
Rhithron Associates, Inc.
Missoula, MT

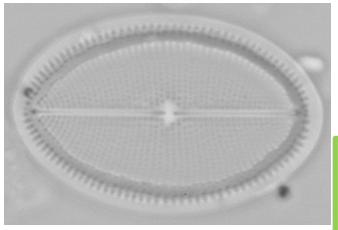
Issues in Periphyton Taxonomic Consistency

Issue of Comparability of taxonomic data

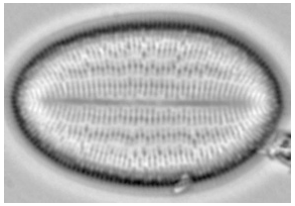
1. Species-level identification for data is often considered most useful, but species concepts/reporting between diatomists can vary

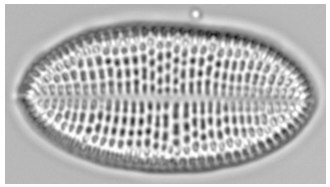
Cocconeis placentula var. euglypta





Cocconeis placentula var. lineata





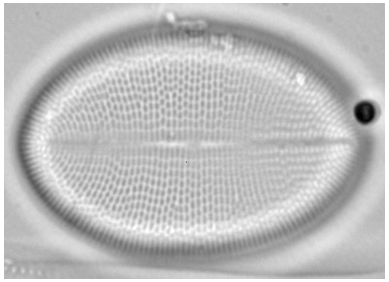
Cocconeis placentula var. pseudolineata

MT Mid Rockies Sed Indicator (Teply 2010)

http://craticula.ncl.ac.uk/EADiatomKey/html/Cocconeis.html

2. Application of identical names

Frustulia lanceolata Agardh 1827
Cymbella lanceolata (Agardh) Agardh 1830
Navicula lanceolata (Agardh) Kützing 1844
Schizonema lanceolatum (C. Agardh) Kuntze 1898



Cocconeis placentula

MT Warm Water Sed Indicator (Teply 2010)

Navicula pupula Kützing 1844
Schizonema pupula (Kützing) Kuntze 1898
Sellaphora pupula (Kützing) Mereschkowsky 1902

Challenges to maintaining Taxonomic Consistency

- Large number of species (20,000 – >1 million)
- Species range from cosmopolitan to highly endemic
- Morphological differences at species level can be difficult to distinguish (SEM needed for ID of some species)
- Initial (and still commonly used) work establishing known ecology of species now over 20 years old
    - New genera have been applied to many species and some have been divided into several species now
- Abundant species reported in more recent studies often specific to the study site, difficult to apply results from study to another due to differences in assemblages present

Applied diatom taxonomy/analysis observations

- Often work in small groups – communication between groups and agencies limited
- Access to wide geographic range of samples allowing for broad experience not usually available in research situations/applications
- Time constraints for projects can be short
- The data needs and objectives of the study determine best level of taxonomic resolution (more so with bugs) – communication of goals with analysts would enhance their ability to make sure taxonomy best fits the project
- No good way to record unknowns – often lumped at genus-level

Rhithron Associates, Inc.
Missoula, MT

Applied diatom taxonomy/analysis observations – cont.

- Tendency of agencies and sample collectors to hold samples for months or years before sending for analysis
  - Preservation of NDA often poor,
  - Inadequate use of preservative can result in sample being eaten (by other tiny residents) prior to analysis
  - Increased potential for dissolution and overgrowth of diatom valves

Rhithron Associates, Inc.
Missoula, MT

Current resources for achieving Taxonomic Consistency

- Printed taxonomic resources – books and journal articles
- Websites focused on diatom taxonomy and ecology
- US taxa lists – NAWQA (ANSP), Integrated Taxonomic Information System (IT IS - various Gov. agencies), Catalog of Life
- Diatoms of the US website (http://westerndiatoms.colorado.edu)

Rhithron Associates, Inc.
Missoula, MT

Ideas for improving Taxonomic Consistency

- Increase communication between diatomists as well as with agencies
- Increase amount of external QA or trading of material for purpose of comparing populations of difficult taxa
- Provide previous counts and images (or even slides) from previous analyses to diatomists analyzing current project. Include synonymy of names/ID's/etc. as part of the project results.
- Update taxa lists used by agencies (e.g. ITIS) to include new genera/species names
- Create list of problem/important species that can be addressed as a group

Rhithron Associates, Inc.
Missoula, MT

Ideas for improving Taxonomic Consistency – cont.

- Make taxonomic work a priority for funding allocation when using biological species data (include in project descriptions)
- Require images (reference collection) of all species for projects – range of images better than one. Cost associated with this – but will allow backwards application of name changes at a later date.

Rhithron Associates, Inc.
Missoula, MT

Non-biologic Influences on Periphyton Taxonomic Consistency

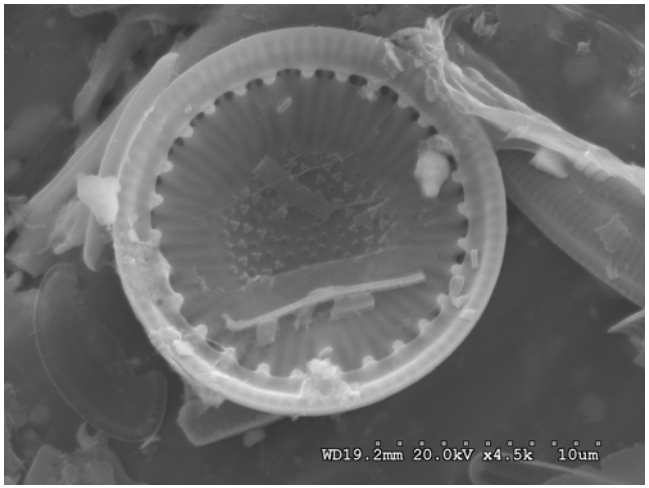
(and assemblages present in the samples)

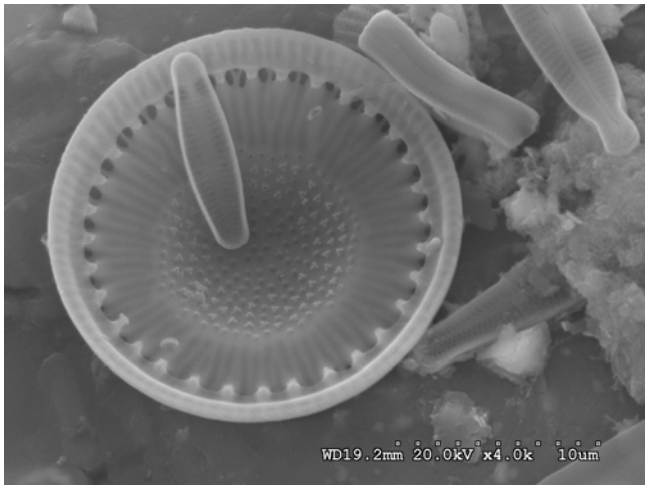
- Sampling protocols
  - Experience of samplers and time at each site
  - Location of sample in river environment
- Season
  - Precipitation & time since last high flow event
- Dominant sediment type
- Presences of plants or other algae
- Water chemistry/characteristics

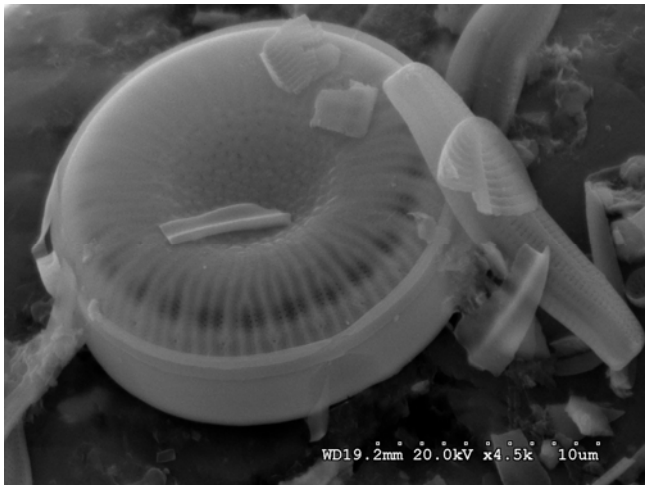
Rhithron Associates, Inc.
Missoula, MT

Rhithron Associates, Inc.
Missoula, MT

Day of sampling

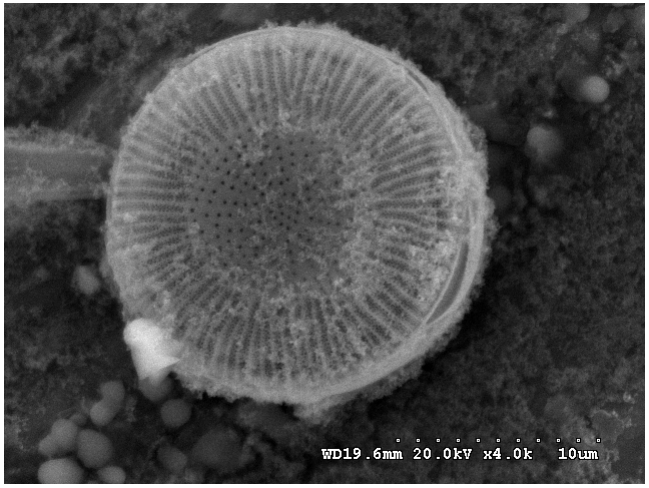


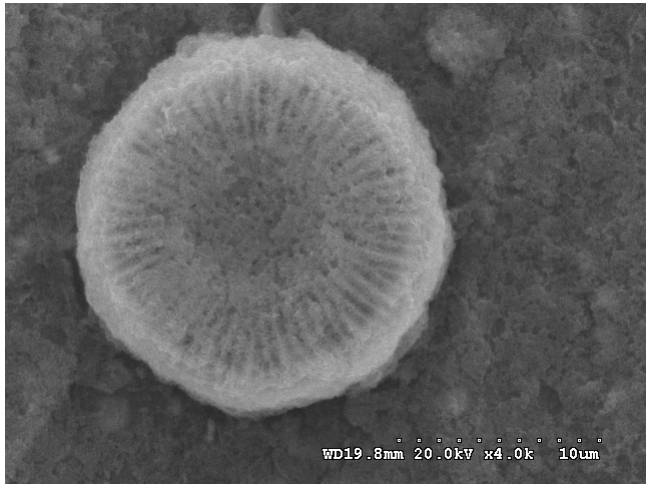




Rhithron Associates, Inc.
Missoula, MT

1 – 2 months later





Issues in Periphyton Taxonomic Consistency

Diane Winter

Rhithron Associates, Inc.
Missoula, MT

www.wordle.net