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Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences
Amelie Jarlman, Jarlman Konsult AB

4th Nordic-Baltic diatom intercalibration/harmonization exercise 2013

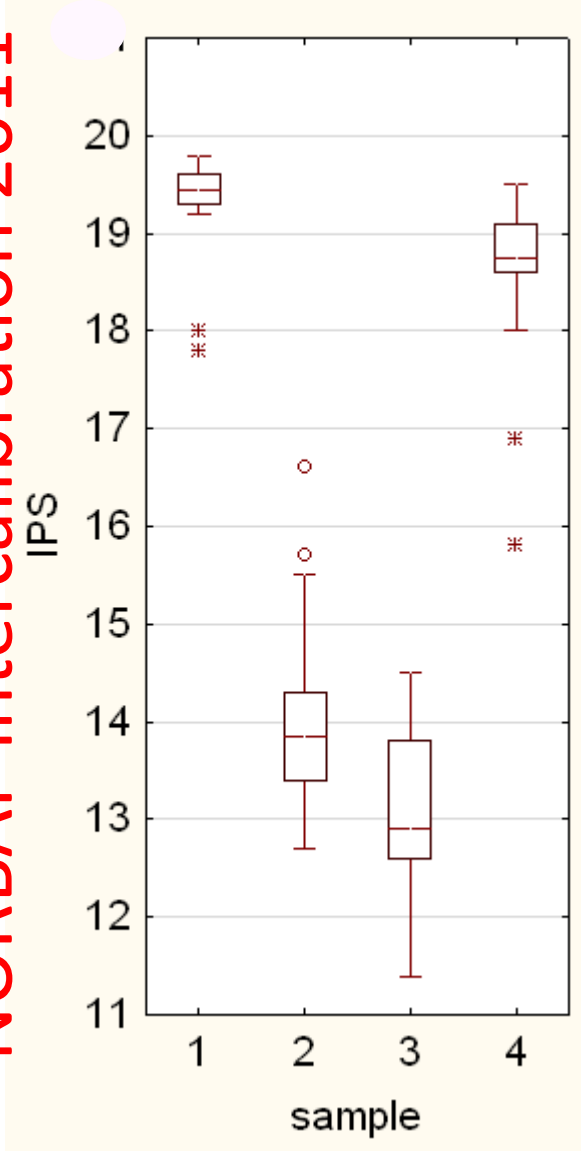
Organization: Maria Kahlert & Amelie Jarlman

Auditors: A. Jarlman &

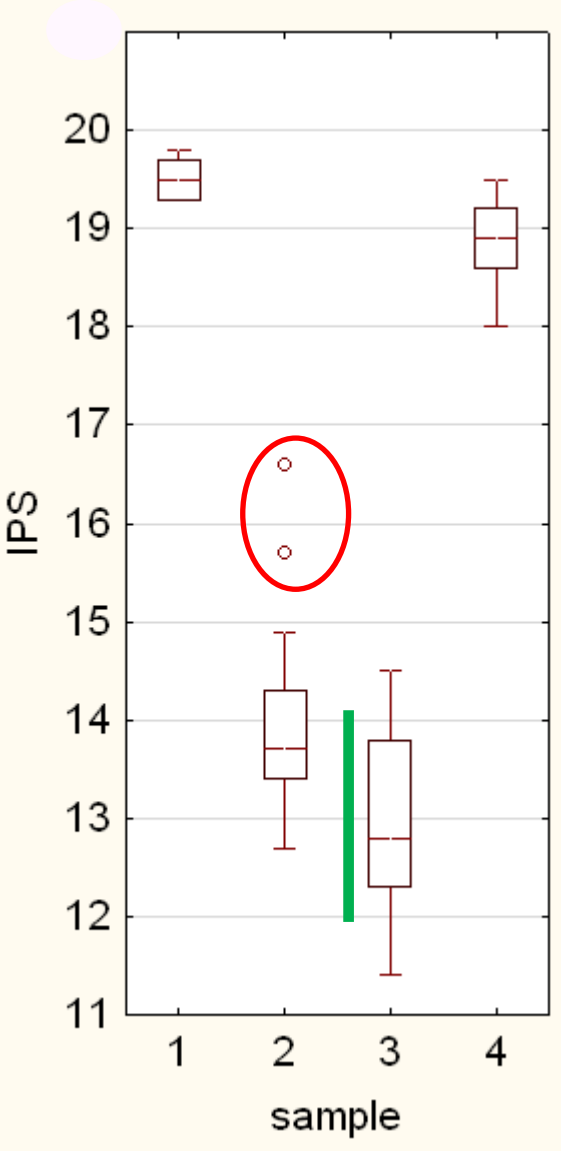
Prof. Dr. Bart Van de Vijver, National Botanic Garden of Belgium

Data analysis: M. Kahlert

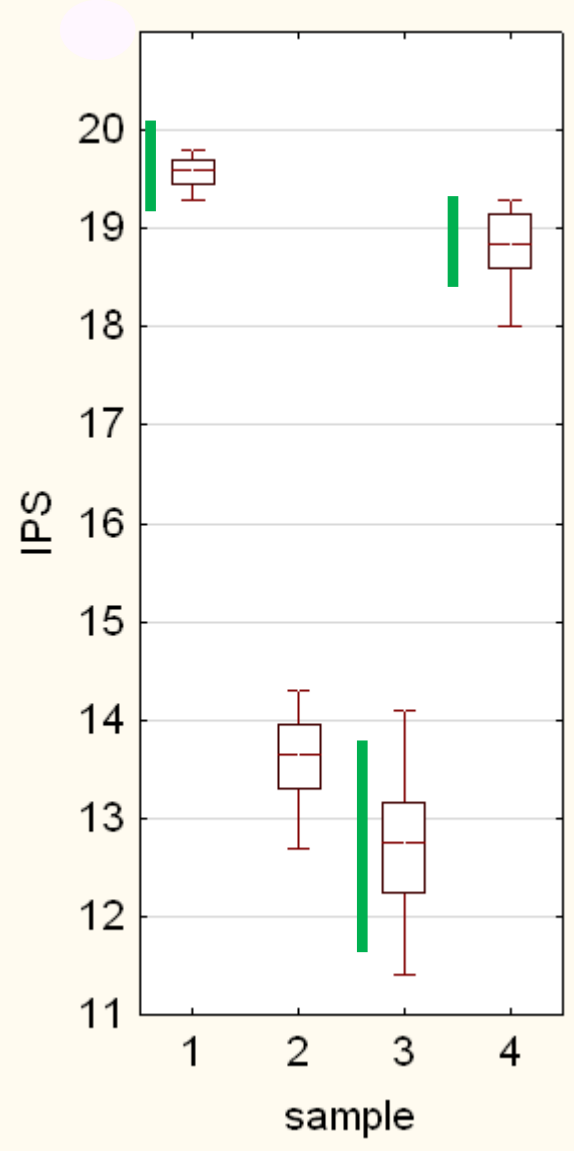
NORBAF intercalibration 2011



All participants



Participants with BC < 60% excluded (final result intercalibration)



Additionally, participants with BC < 70% in sample 2 excluded (according to Kelly 2001, low diversity)

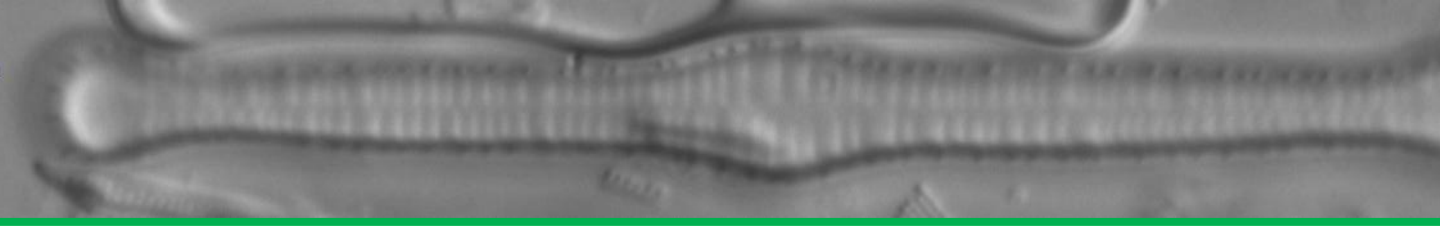
Samples

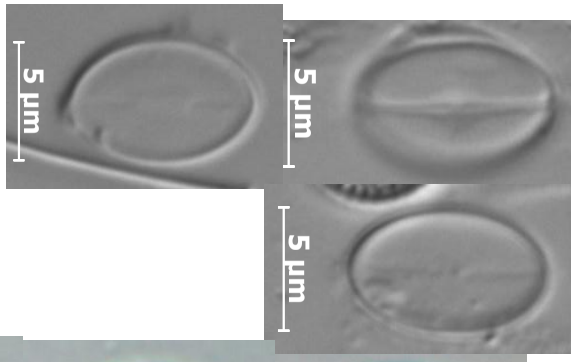
- Nr 1: Örvallsbäcken 4241, 2012-09-19 (project: IKEU - Integrated Studies of the Effects of Liming Acidified Waters).
  Chemistry (12 month period before sampling):
  $pH_{minimum}$ 5,3, pH_{mean} 5,9
  TP_{mean} 12µg/l

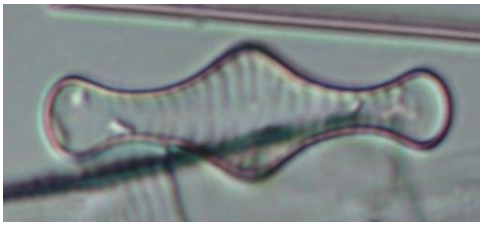
- Nr 2: Tullstorpsån (i Skåne), 2011-09-19. (project: Tullstorpsåprojektet).
  Chemistry (12 month period before sampling):
  $pH_{minimum}$ 7,5, pH_{mean} 7,9
  TP_{mean} 159 µg/l

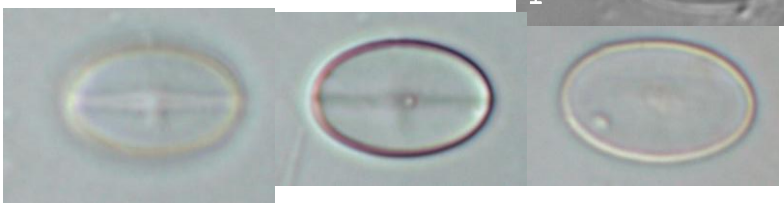
Dominating taxa – sample 1

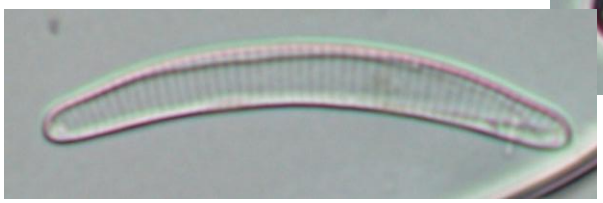
		%
Brachysira neoexilis	BNEO	3,5
Eunotia bilunaris var. mucophila	EBMU	2,1
Eunotia formica	EFOR	5,1
Eunotia incisa var. incisa	EINC	7,1
Eunotia minor	EMIN	11,1
Eunotia rhomboidea	ERHO	4,6
Frustulia erifuga	FERI	9,4
Psammothidium kuelbsii	PKUE	2,5
Tabellaria flocculosa	TFLO	16,5
Tabellaria quadriseptata	TQUA	2,1

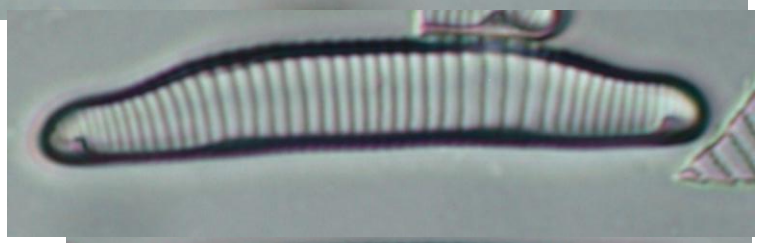


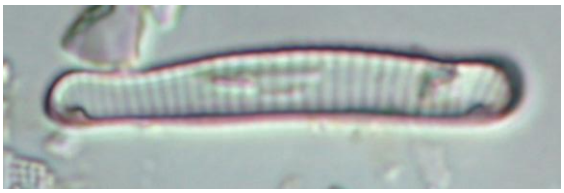


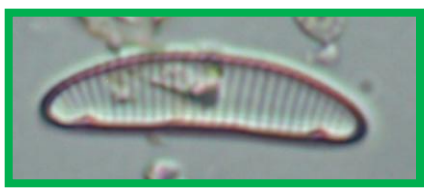


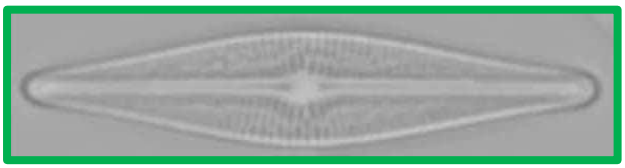




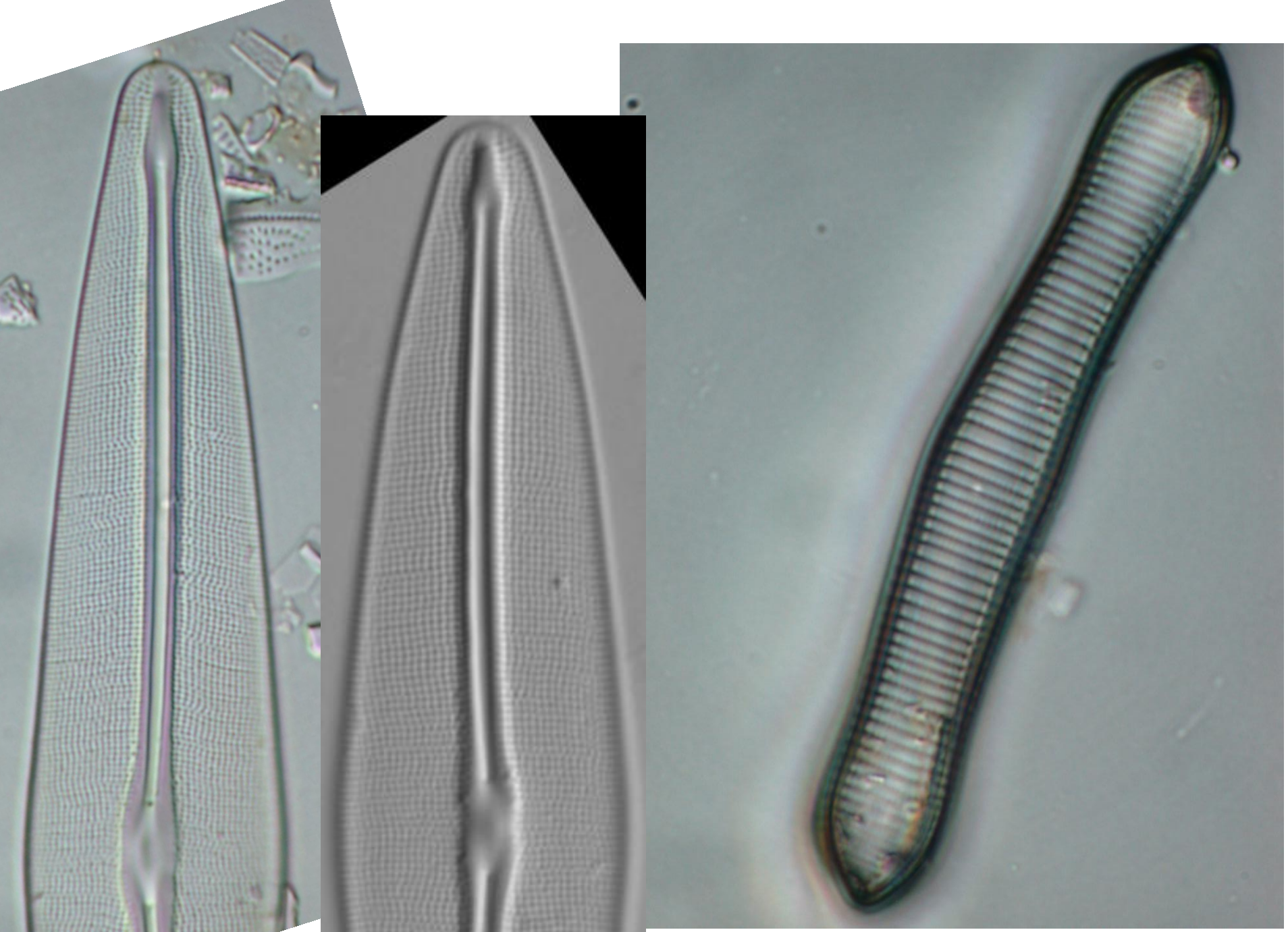


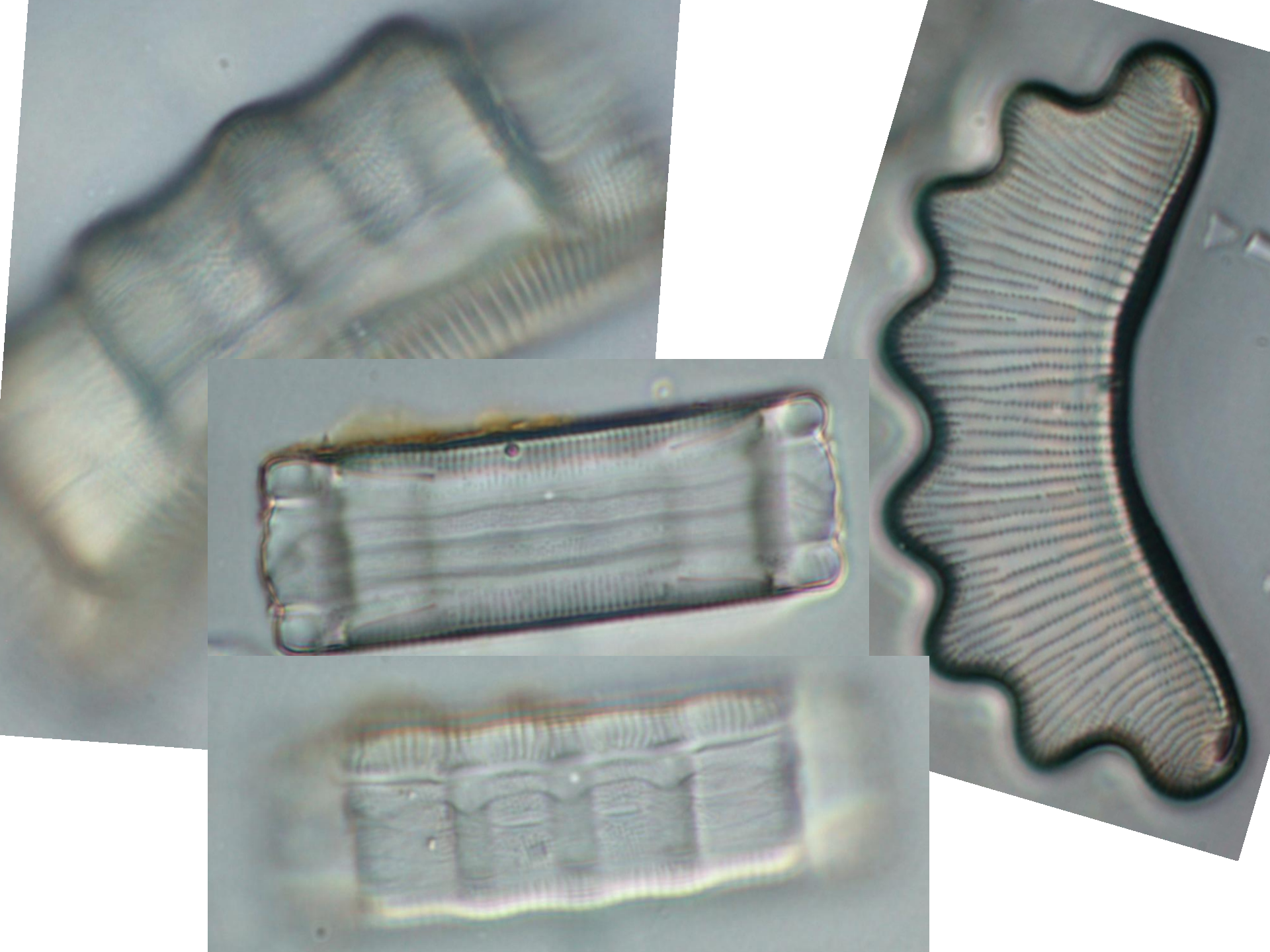


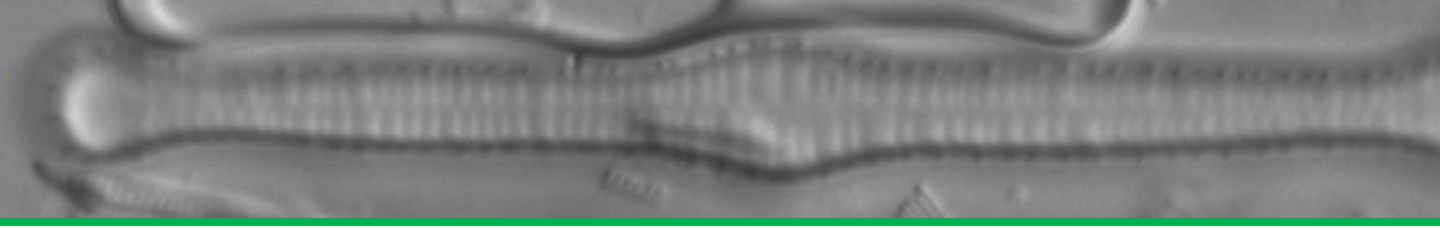


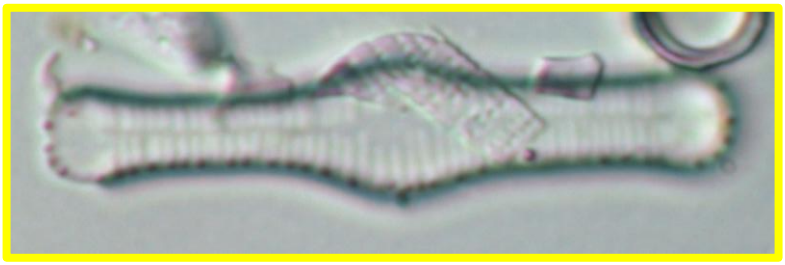


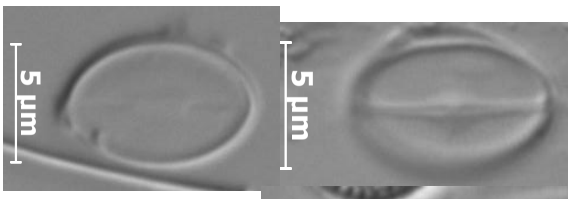
Picture: David Mann

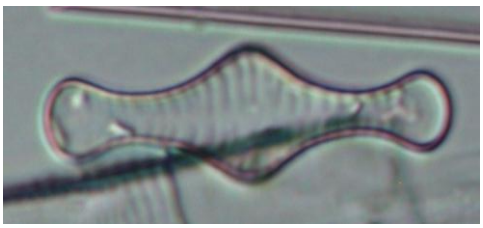


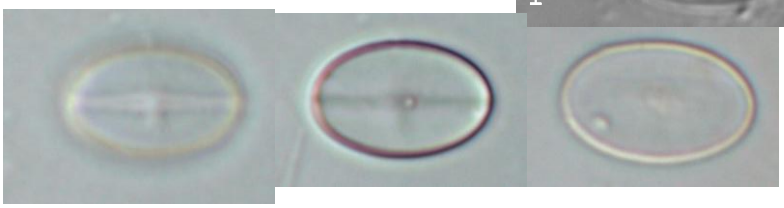


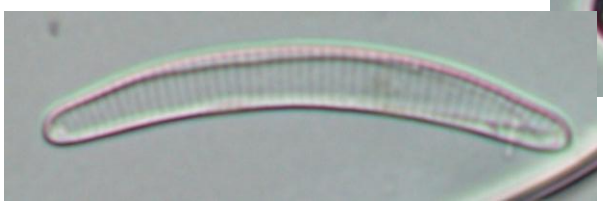


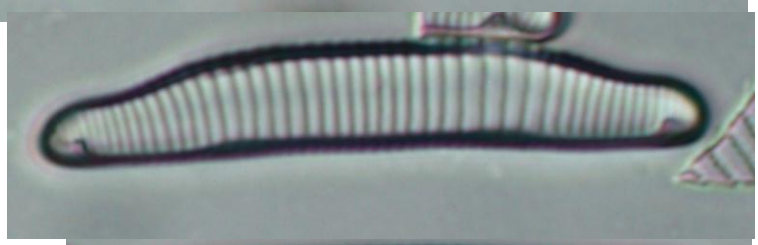


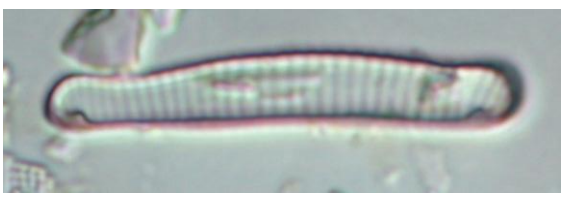


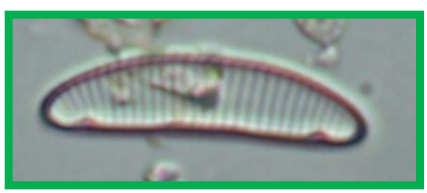


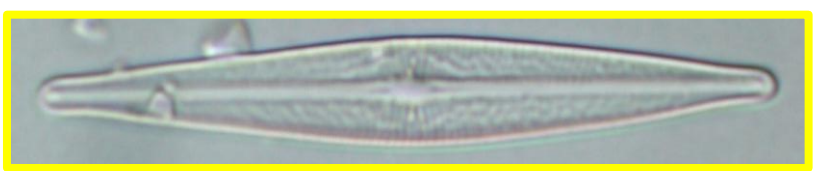


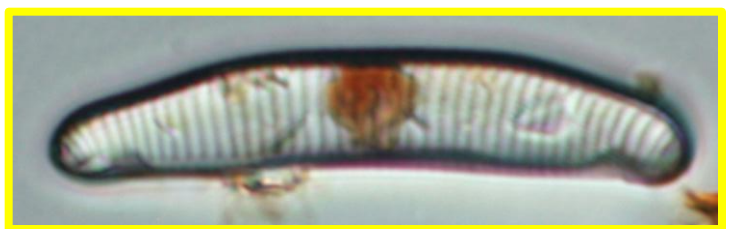


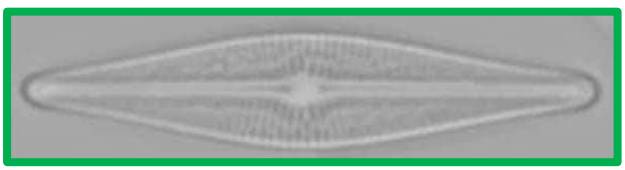




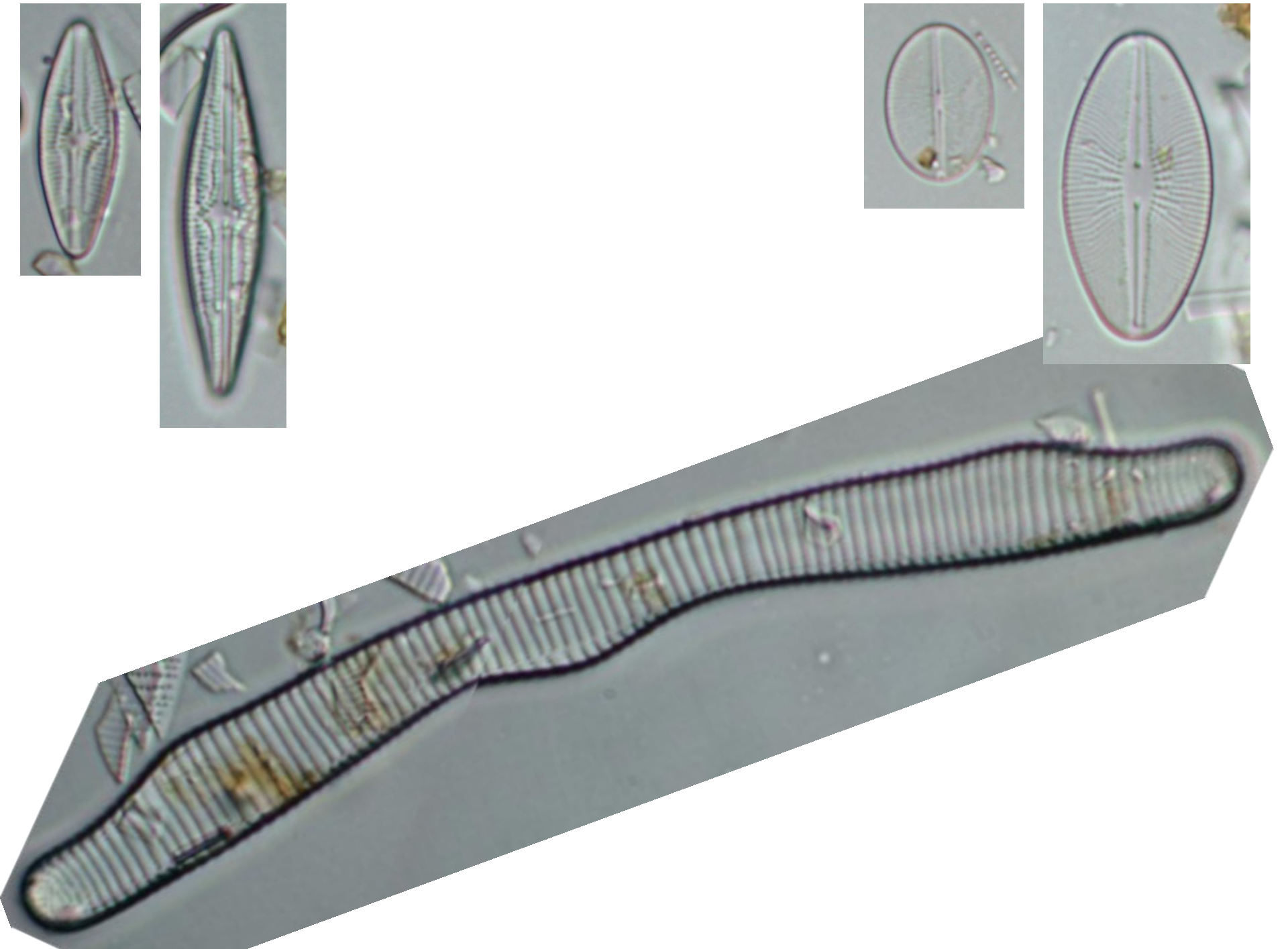








Picture: David Mann



Information about taxa pooling before analysis

Sample 1

- Taxa only idnetified to genus removed from analysis
- AMIN all three groups pooled (as there were few valves, error of measurements high, not a participant error)
- Direct synonyms pooled (e.g. FGRA and FCGR, EETE and ETEN etc.)
- *Fragilaria capucina* var. *capucina* (FCAP), *F. capucina* Desmazieres s.l. (FCAPsl), *Fragilaria capucina* group 3 (width < 3 µm, alternate striae 9-14 in 10 µm) (FCP3) and *Fragilaria capucina* s.l. (FCPGsl) all pooled to FCAPsl
- *Frustulia rhomboides* (Ehrenberg) De Toni (FRHO) changed to FERI
- *Fragilaria pinnata* (FPIN), *Staurosirella pinnata* (SPIN), *Staurosira pinnata* var. *pinnata* (SRPI) and *Staurosira pinnata* s.l. (SRPIsl) all pooled to SRPIsl
- New names for *Eunotia* taxa pooled into *Eunotia* sp.

Threshold was set to BC **55%** for both samples because of very high diversity

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RESEARCH NOTE

USE OF SIMILARITY MEASURES FOR QUALITY CONTROL OF BENTHIC DIATOM SAMPLES

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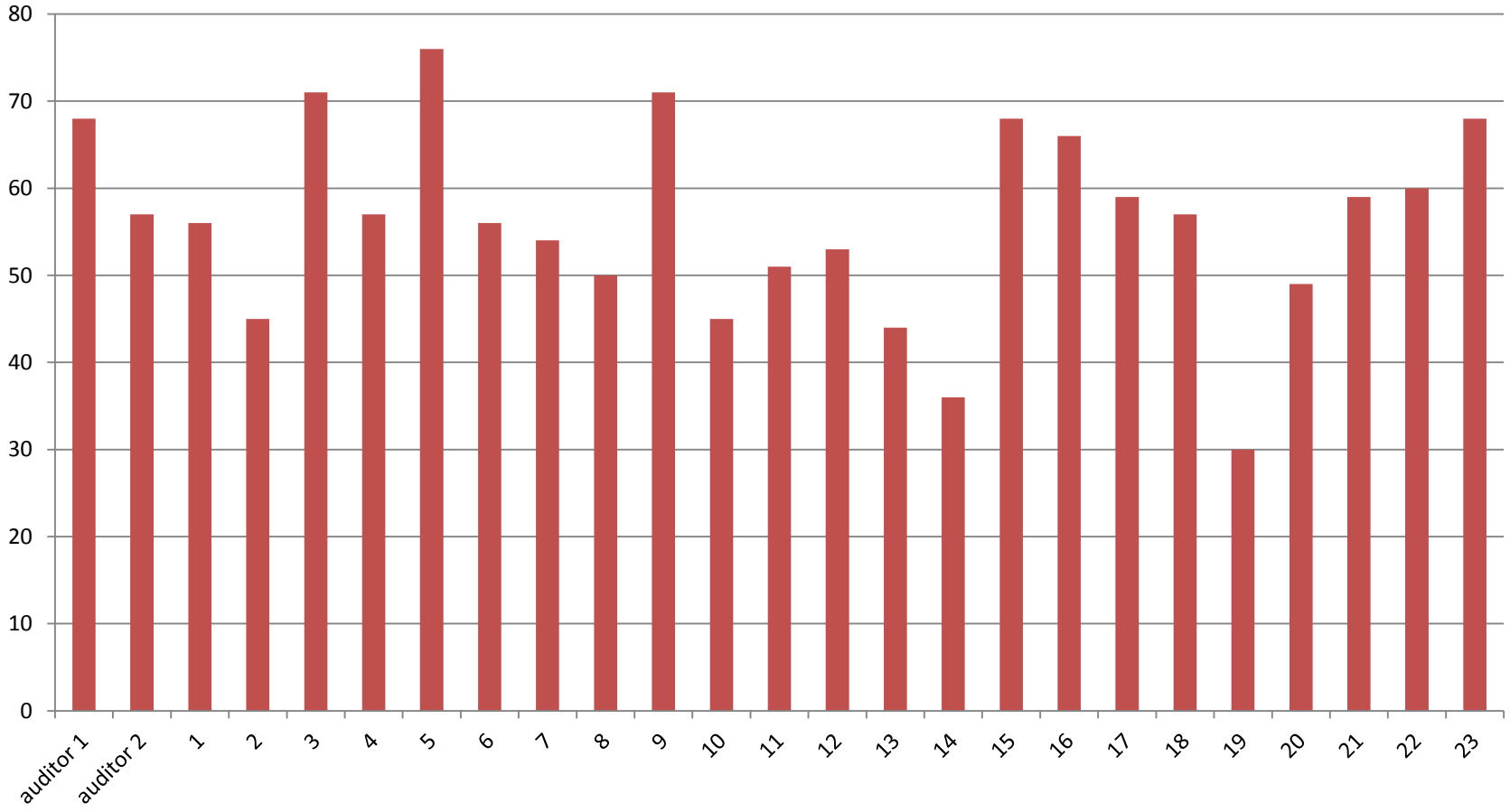
(First received 22 March 2000; accepted in revised form 1 November 2000)

Abstract—A method for evaluating the similarity of replicate benthic diatom samples based on the Bray–Curtis similarity measure is described. This technique may be useful as part of quality control procedures where objective performance measures are required. Levels of similarity >60% typically indicate good agreement between the primary analyst and auditor. However, an evaluation of 57 comparisons indicated that achievable levels of similarity were dependent upon the species diversity of the sample, with samples with high species diversity typically having lower levels of similarity than samples with low species diversity. Whilst a threshold value of 60% is adequate for most samples, a stiffer threshold of 70% should be applied to samples with very low levels of diversity. © 2001 Elsevier Science Ltd. All rights reserved

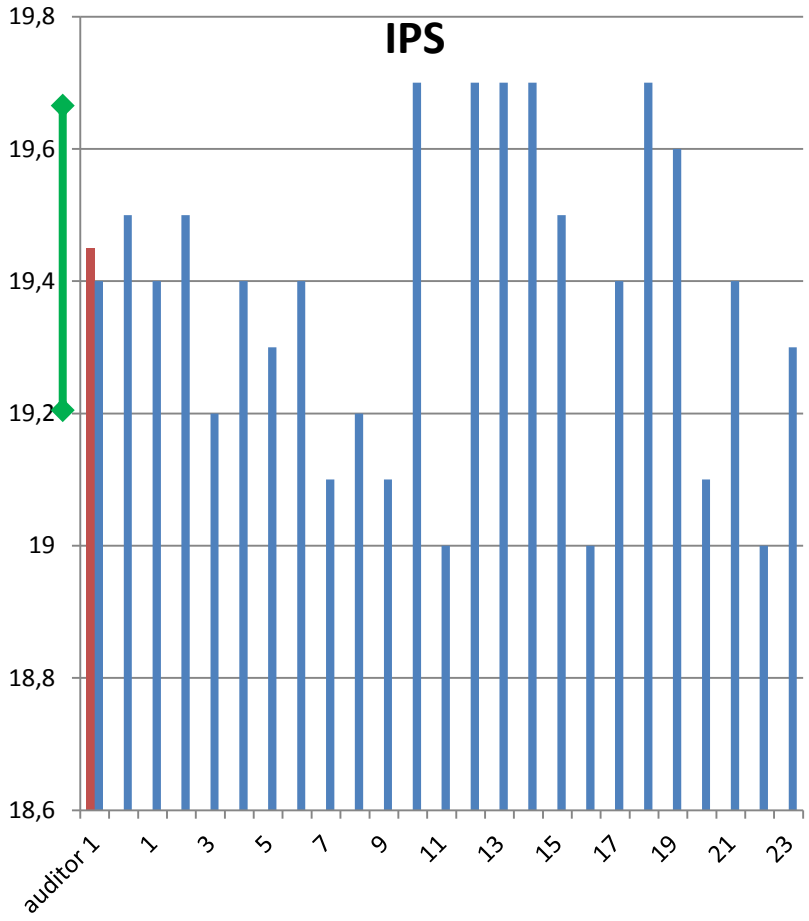
Key words—algae, diatoms, rivers, monitoring, eutrophication, quality assurance

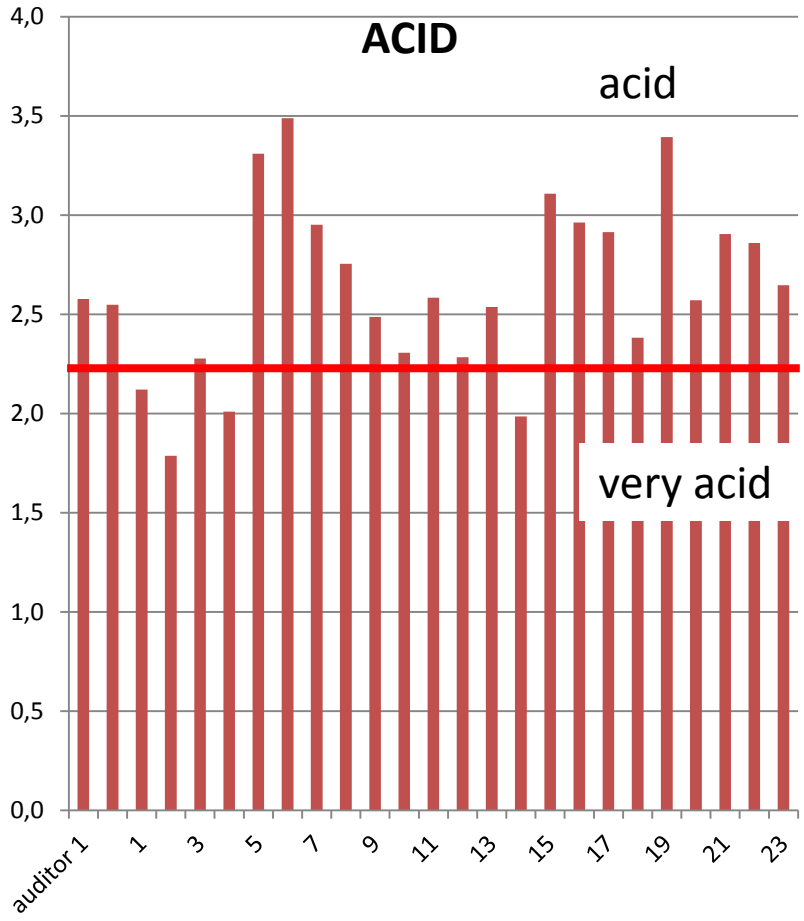
Taxa number – sample 1

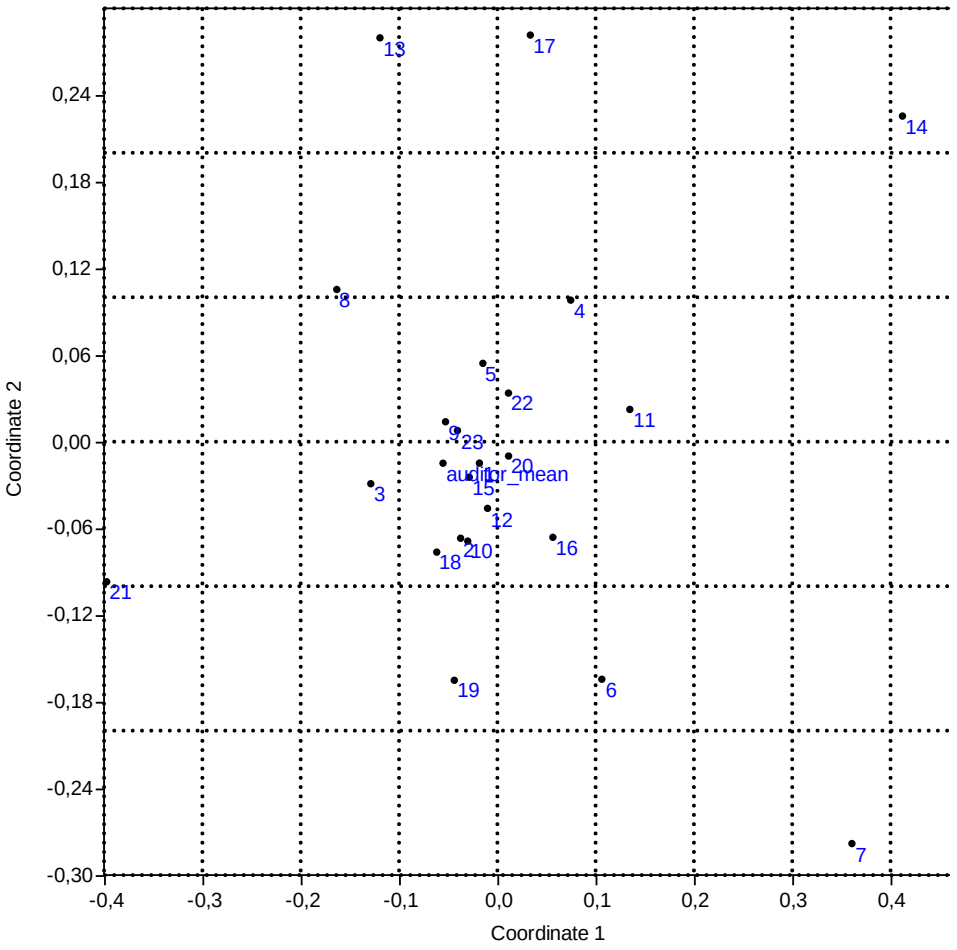


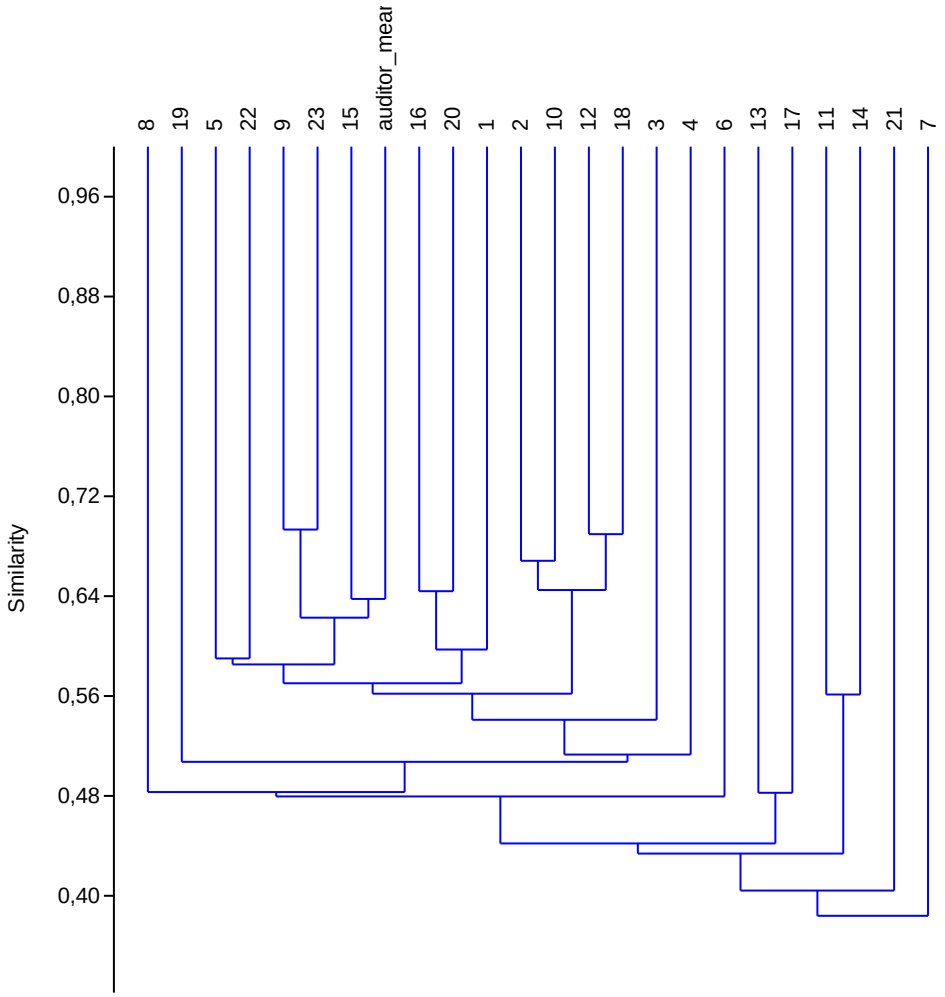
Diversity Hills N': 14,8 (mean of auditors)

Index results – sample 1

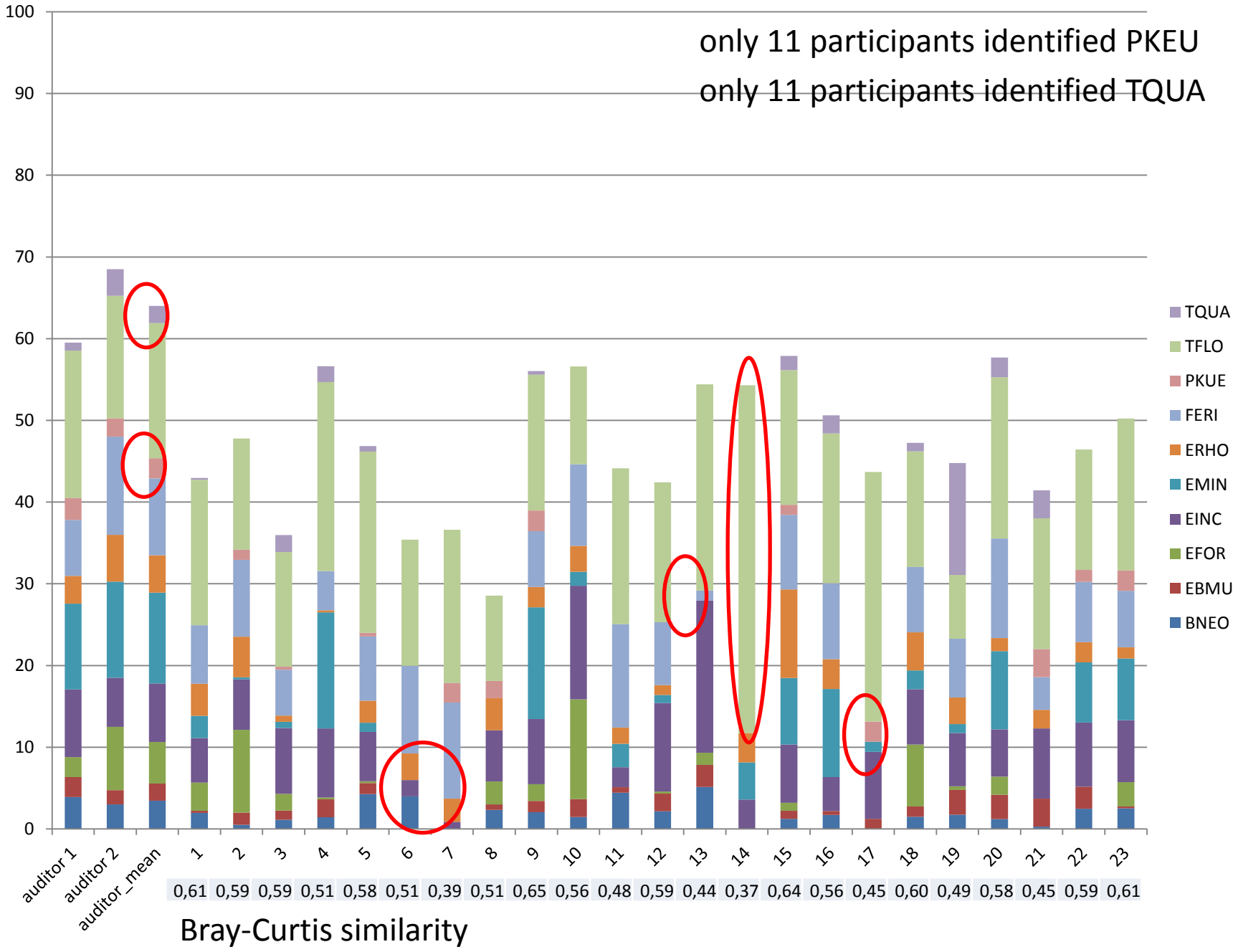








Participants from same laboratory are similar to each other! -> harmonization effect!


only 11 participants identified PKEU
only 11 participants identified TQUA
100
90
80
70
60
50
40
30
20
10
0
TQUA
TFLO
PKUE
FERI
ERHO
EMIN
EINC
EFOR
EBMU
BNEO
auditor 1
auditor 2
auditor_mean
1
2
3
4
5
6
7
8
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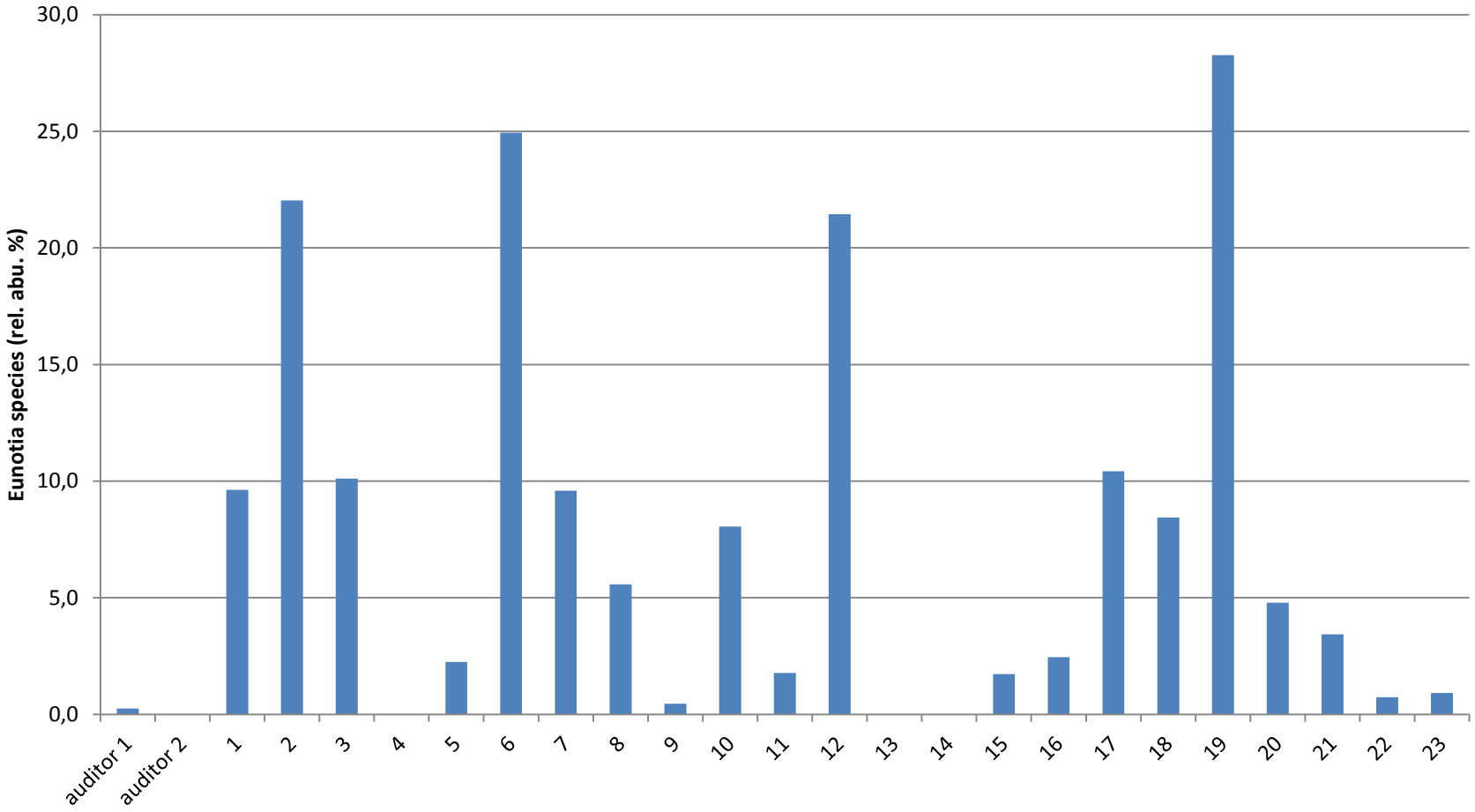
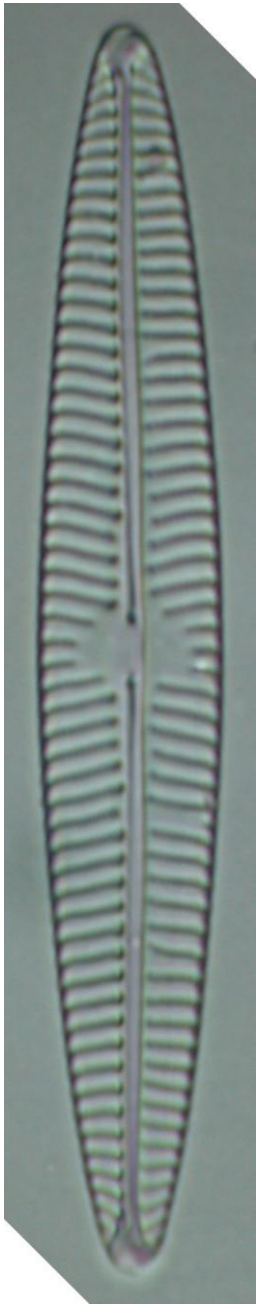
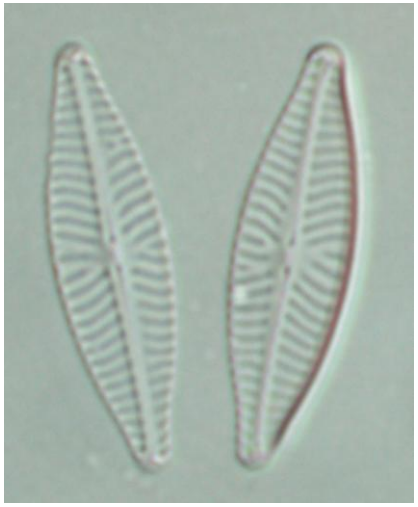
0,61 0,59 0,59 0,51 0,58 0,51 0,39 0,51 0,65 0,56 0,48 0,59 0,44 0,37 0,64 0,56 0,45 0,60 0,49 0,58 0,45 0,59 0,61
Bray-Curtis similarity

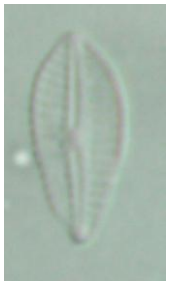
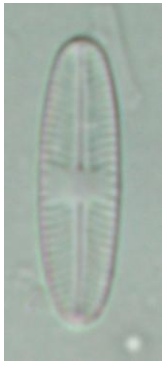
Eunotia species (mostly girdles)

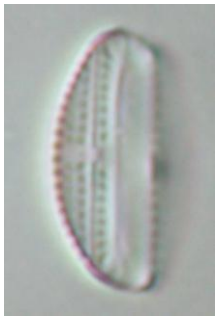


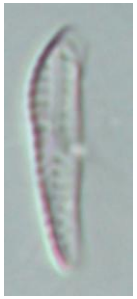
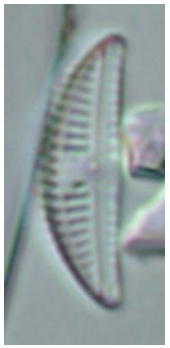
Dominating taxa – sample 2

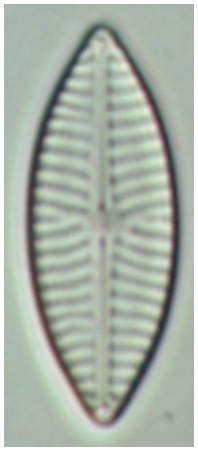
Amphora pediculus s.l.	APEDsl	18,8
Achnanthidium minutissimum group III (mean width >2,8µm)	ADM3	5,3
Planothidium frequentissimum	PLFR	9,1
Navicula tripunctata	NTPT	6,6
Navicula reichardtiana	NRCH	4,4
Mayamaea atomus var. permitis	MAPE	8,4
Mayamaea atomus var. alcimonica	MAAL	3,6
Fistulifera saprophila	FSAP	5,9
Eolimna subminuscula	ESBM	5,6
Eolimna minima	EOMI	3,2

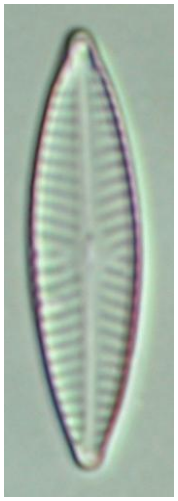



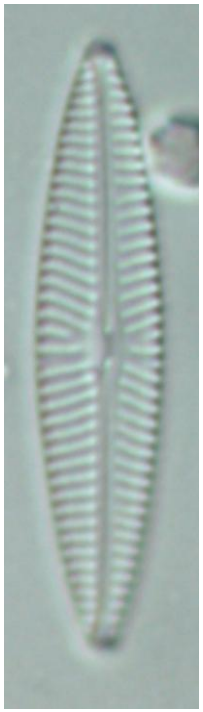









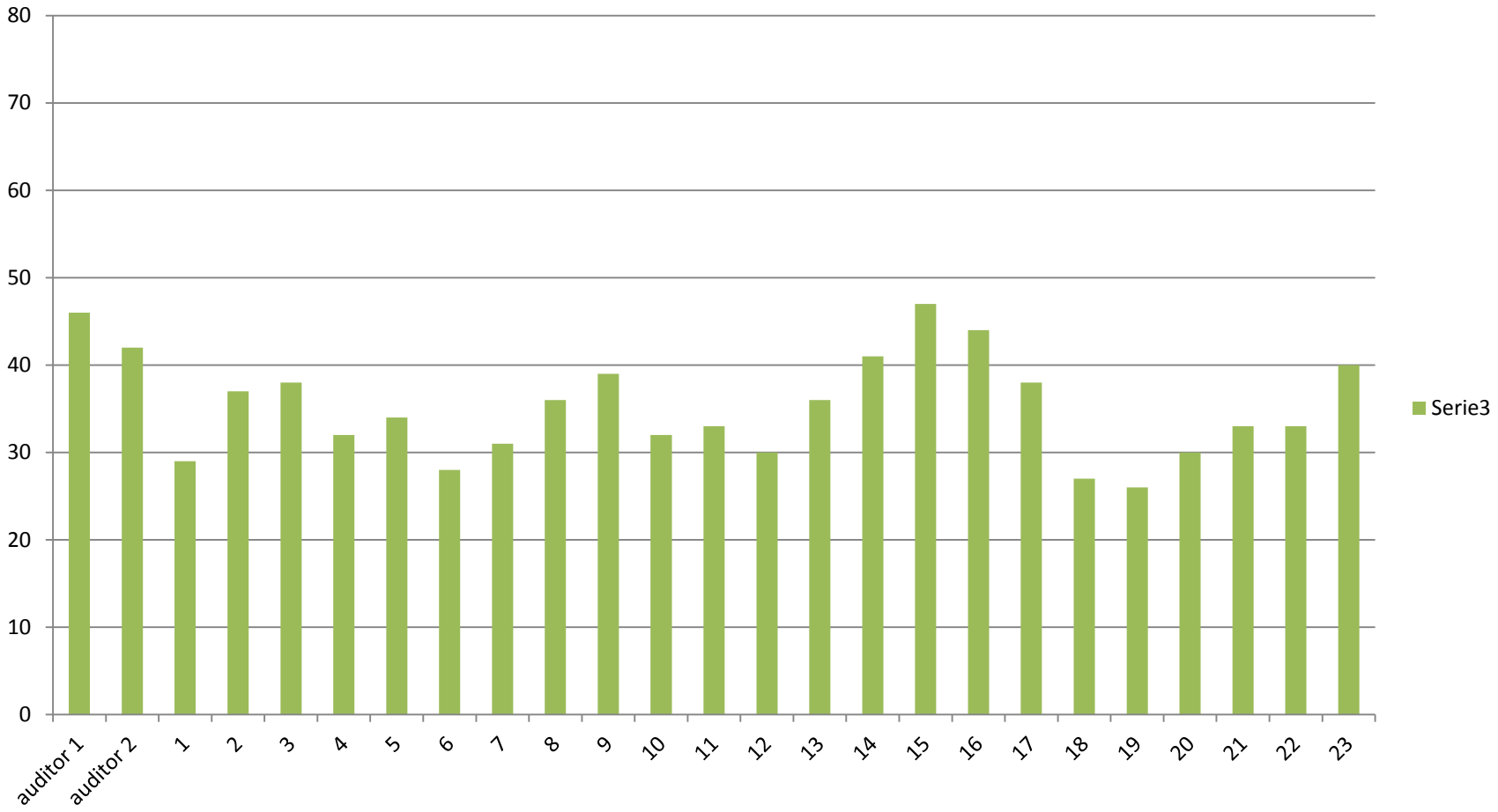


Information about taxa pooling before analysis

Sample 2

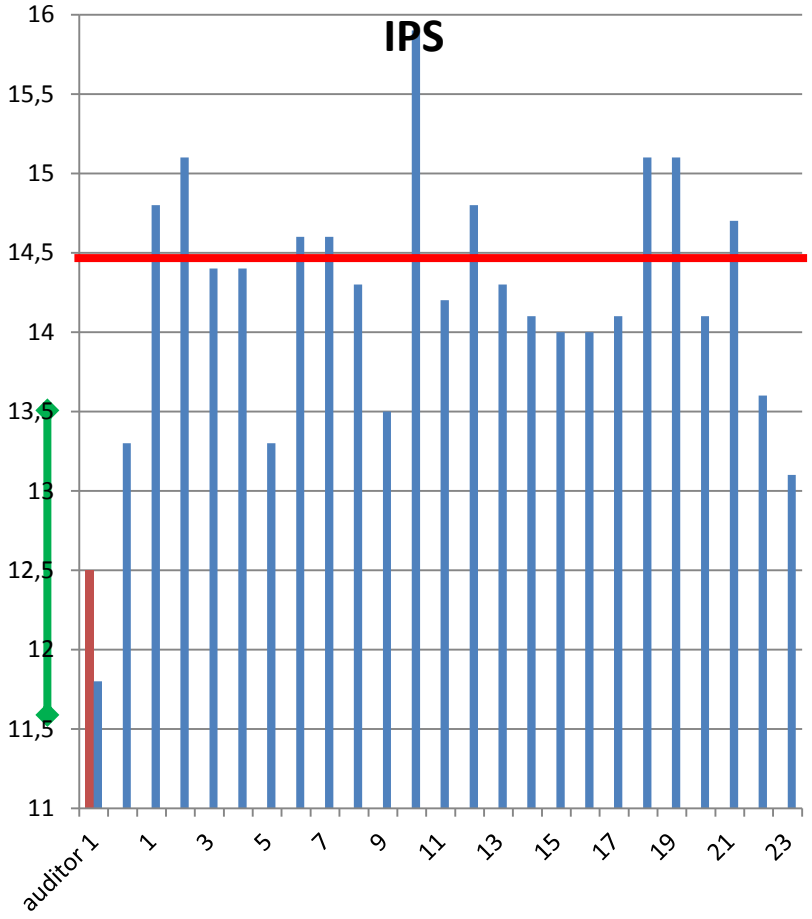
- Taxa only identified to genus removed from analysis
- Direct synonyms pooled
- *Achnanthes lanceolata* ssp. *frequentissima* var. *rostratiformis* Lange-Bertalot (ALFF) changed to *Planothidium frequentissimum* (Lange-Bertalot) Lange-Bertalot (PLFR)
- *Amphora indistincta, A. minutissima* and *A. pediculus* pooled to APEDsl
- *Fragilaria capucina* group 2 (FCP2) and *Fragilaria capucina* s.l. (FCPGsl) pooled to FCAPsl
- *Gomphonema parvulum* f. *saprophilum* Lange-Bertalot & Reichardt (GPAS) pooled into *Gomphonema parvulum* (Kützing) Kützing (GPAR)
- *Nitzschia levidensis* var. *salinarum* (NLSA) and *Nitzschia salinarum* pooled
- Particiant 21 had AMI2 with a mean width of 2,75µm -> was moved to AMI3 because of threshold effects

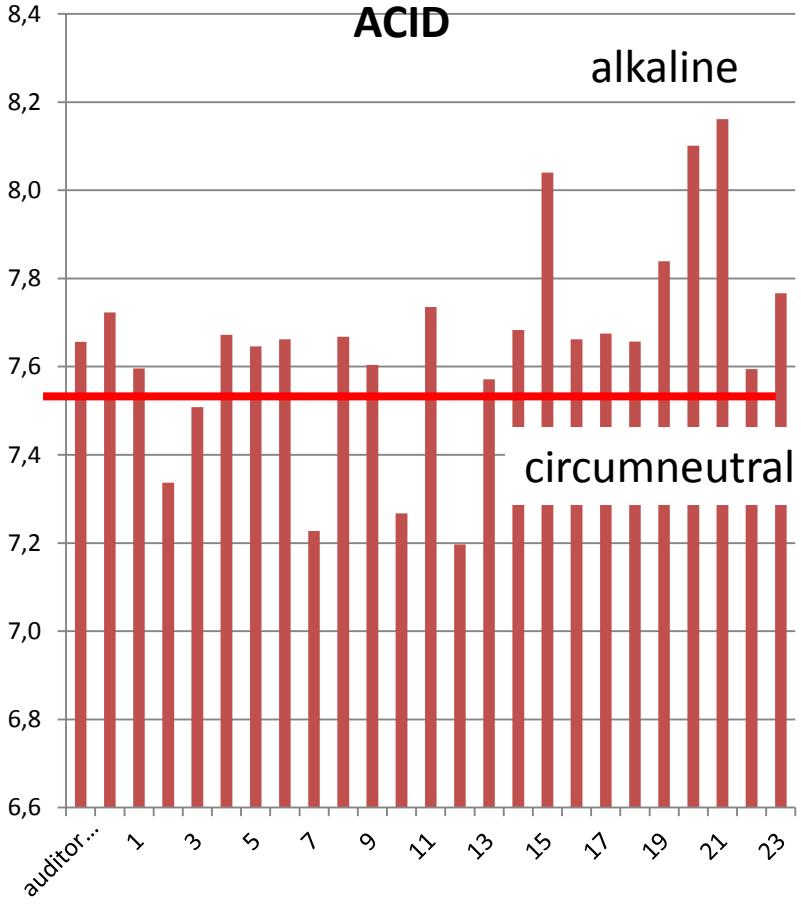
Taxa number – sample 2



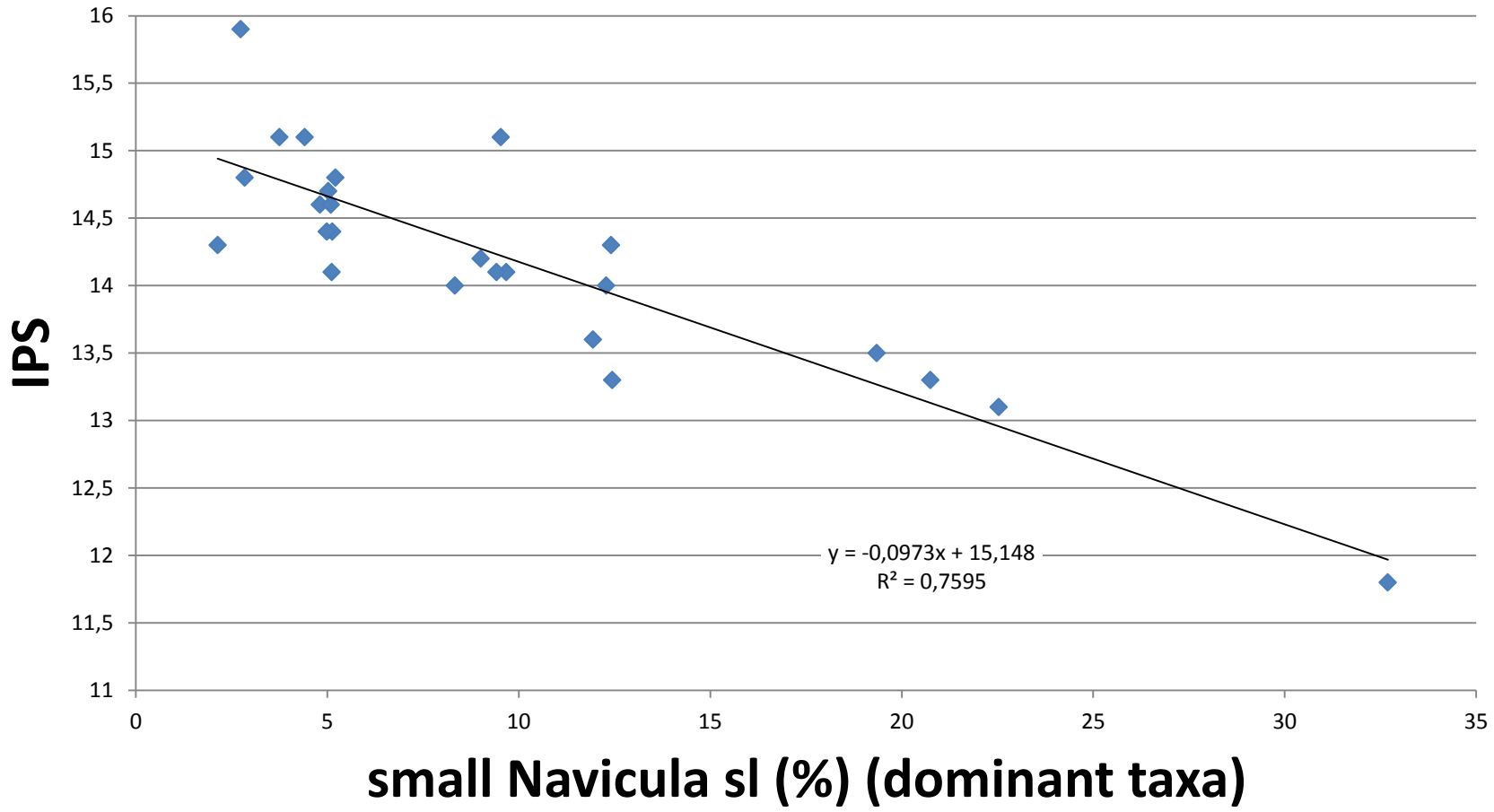
Diversity Hills N': 13,4 (mean of auditors)

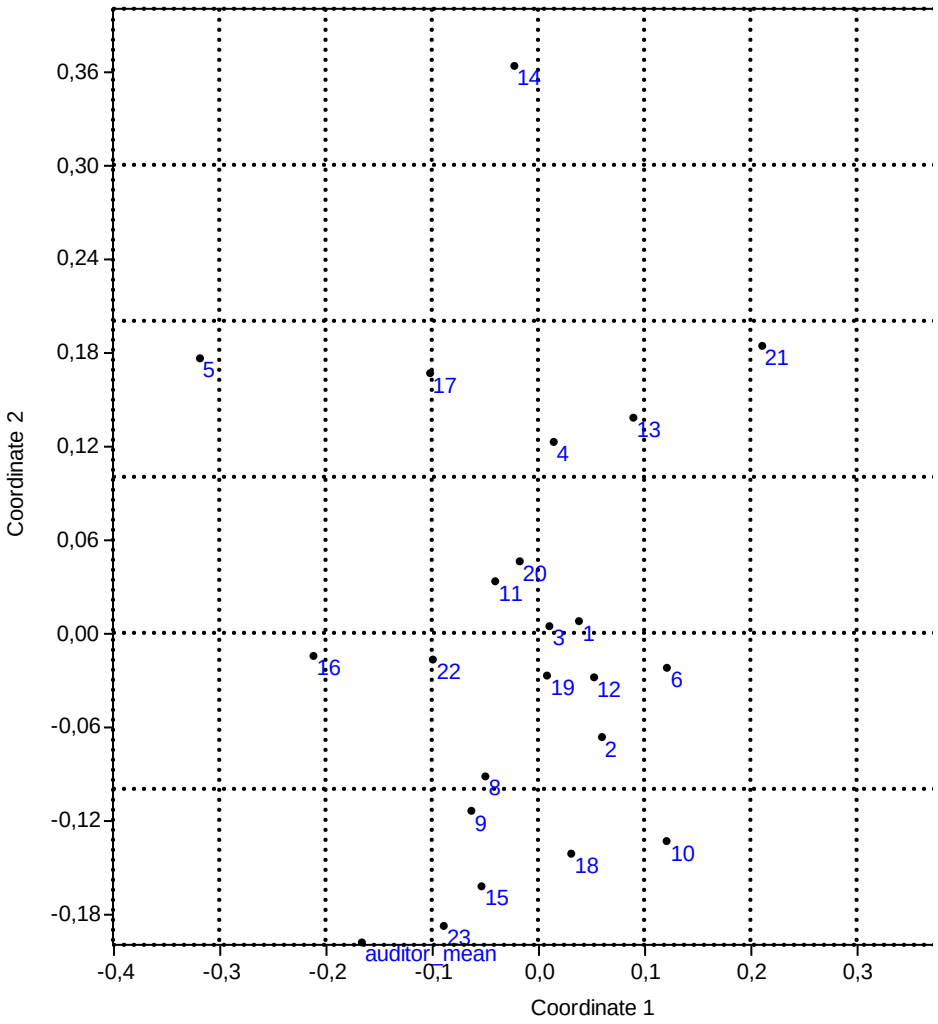
Index results – sample 2

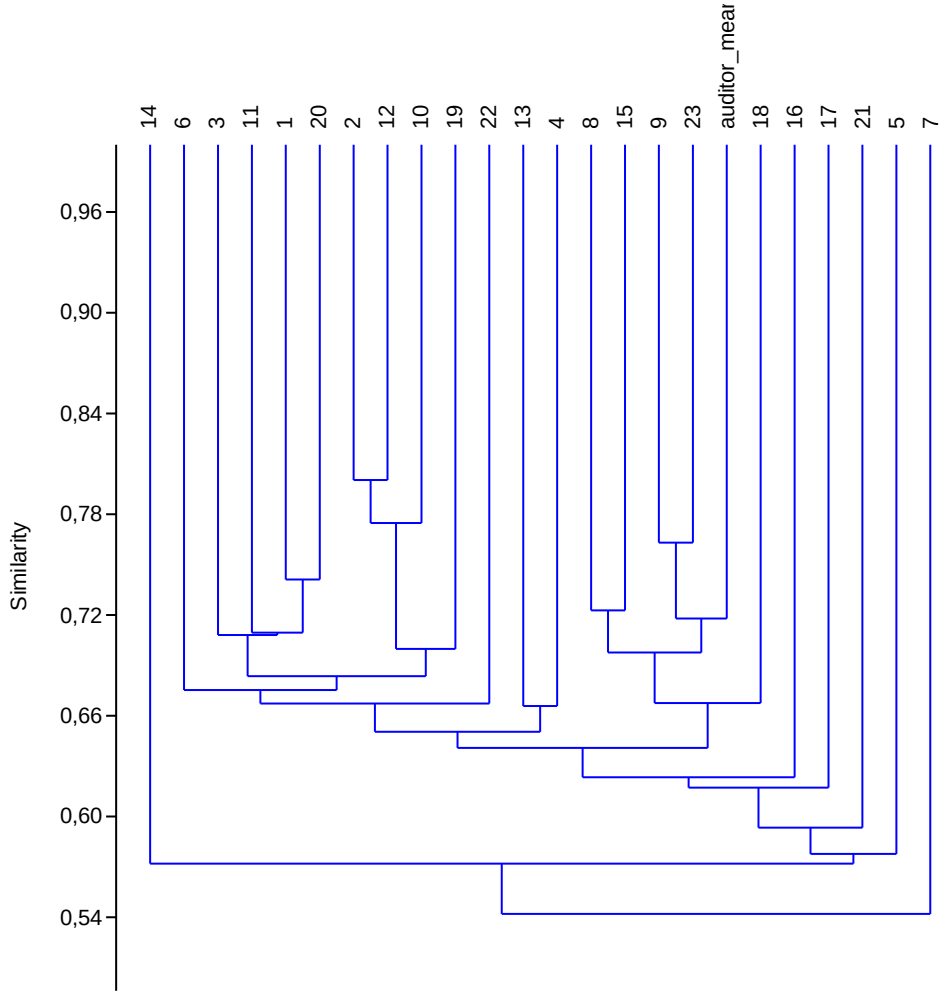


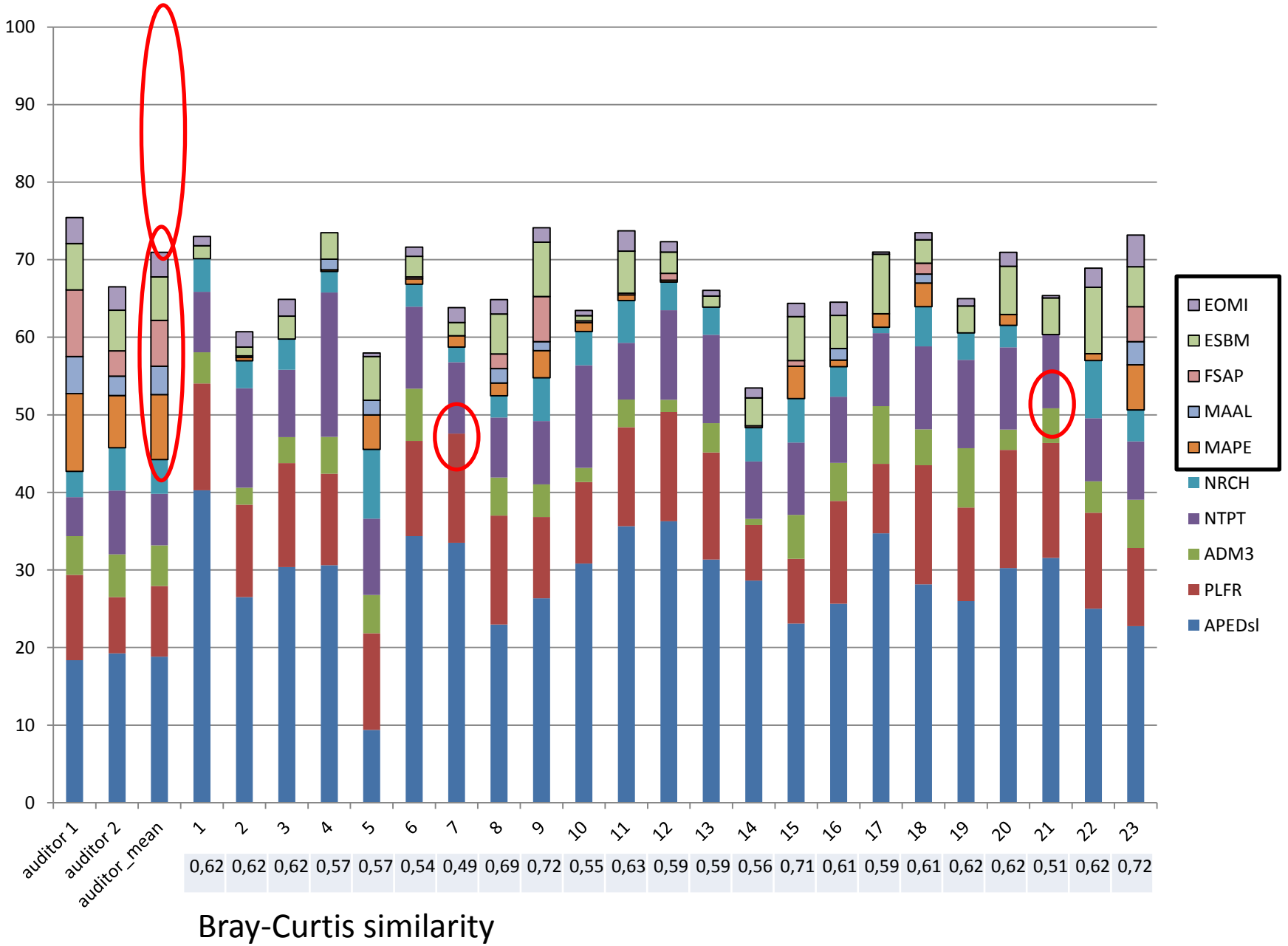


One reason for different IPS values... small *Navicula* sl.



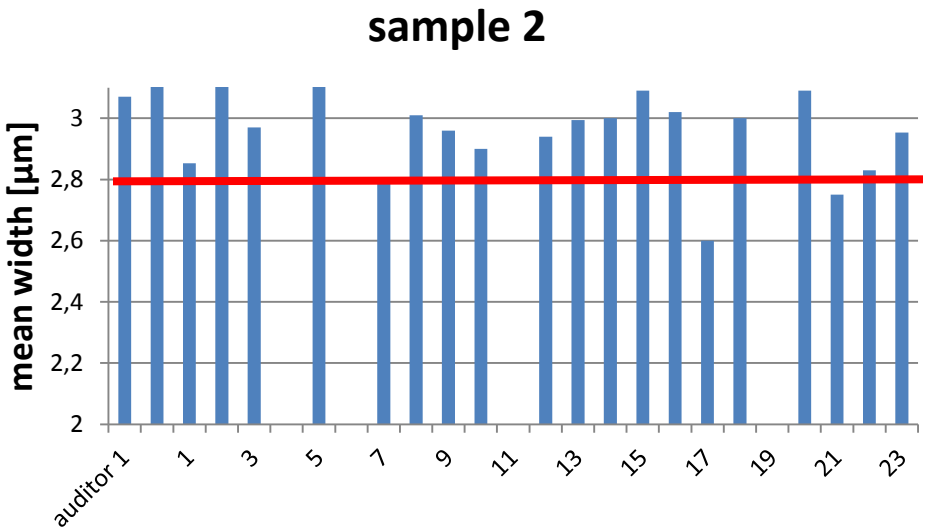

Coordinate 2
0,36
0,30
0,24
0,18
0,12
0,06
0,00
-0,06
-0,12
-0,18
-0,4
-0,3
-0,2
-0,1
0,0
0,1
0,2
0,3
Coordinate 1
14
5
17
21
13
4
20
11
3
1
16
22
19
12
6
2
8
9
18
10
15
23
auditor_mean


Similarity
0,96
0,90
0,84
0,78
0,72
0,66
0,60
0,54
14
6
3
11
1
20
2
12
10
19
22
13
4
8
15
9
23
auditor_mean
18
16
17
21
5
7


100
90
80
70
60
50
40
30
20
10
0
EOMI
ESBM
FSAP
MAAL
MAPE
NRCH
NTPT
ADM3
PLFR
APEDsl
auditor 1
auditor 2
auditor_mean
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
0,62 0,62 0,62 0,57 0,57 0,54 0,49 0,69 0,72 0,55 0,63 0,59 0,59 0,56 0,71 0,61 0,59 0,61 0,62 0,62 0,51 0,62 0,72
Bray-Curtis similarity

Achnanthidium minutissimum group

- Not required to identify all varieties/species of the *Achnanthidium minutissimum group* with the exception of *A. gracillimum* Lange-Bertalot and *A. caledonicum* Lange-Bertalot.
- However, it is necessary to measure the width of 10-20 valves, calculate the mean width and define by this the size group of *A. minutissimum*. Put value in sheet “mall_lokalbeskrivning”.
- Mean value shall be used in uncertainty analysis: If mean width on limit between 2 *A. minutissimum* groups -> could be the other group as well! -> could be a different IPS value -> could be a different ecological status class!
- SE diatom form



Deformations – Swedish pilot method

Categories of teratological valves:*

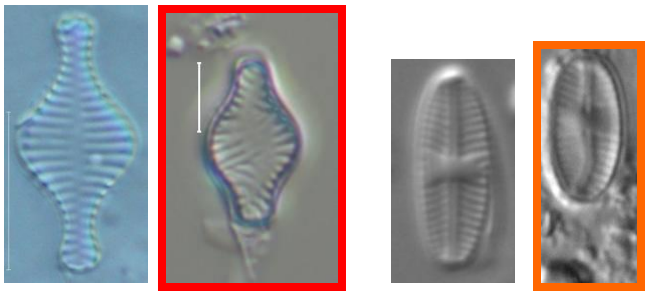
(1) ”Abnormal valve outline”

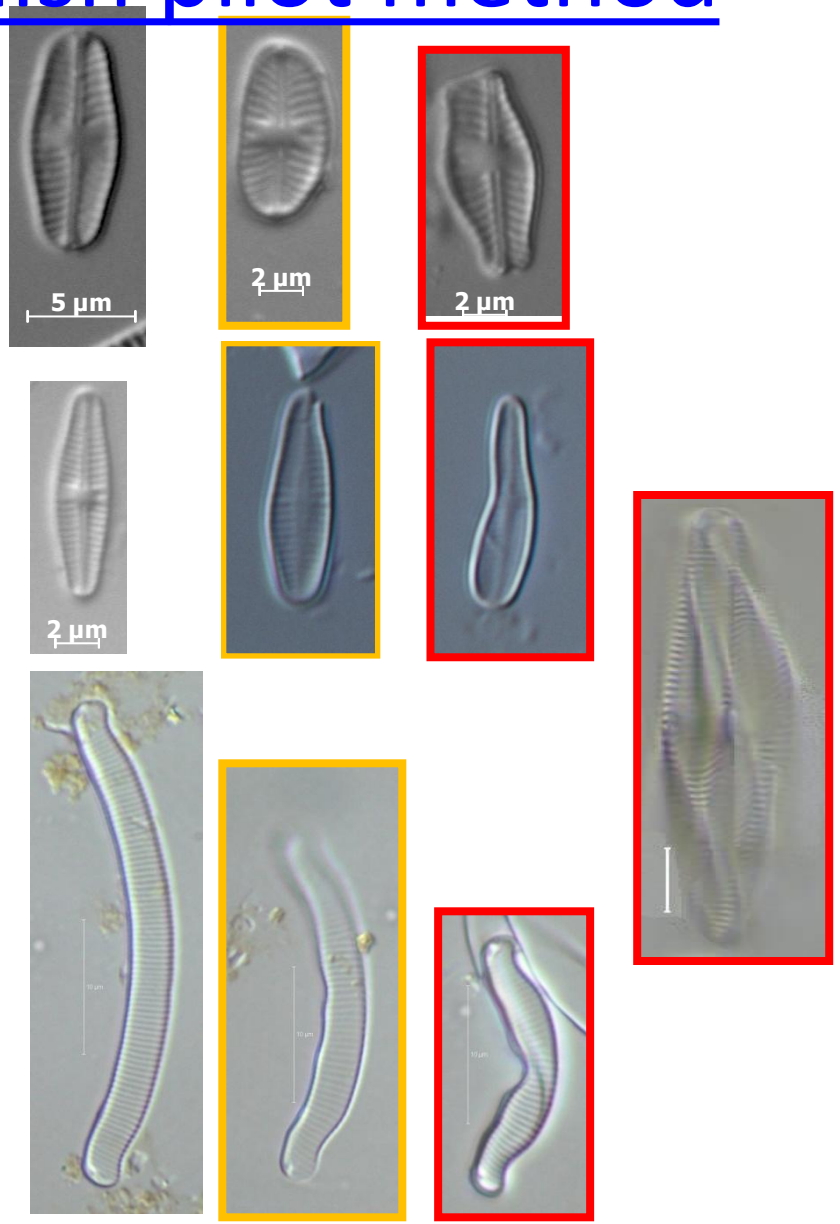
- (a) “asymmetric”
- (b) “bend”
- (c) “notched”
- (d) ”extensions”
- (e) “other”

(2) “Abnormal valve ornamentation”

- (a) “abnormal striaetion”
- (b) “abnormal raphe”
- (c) “other”

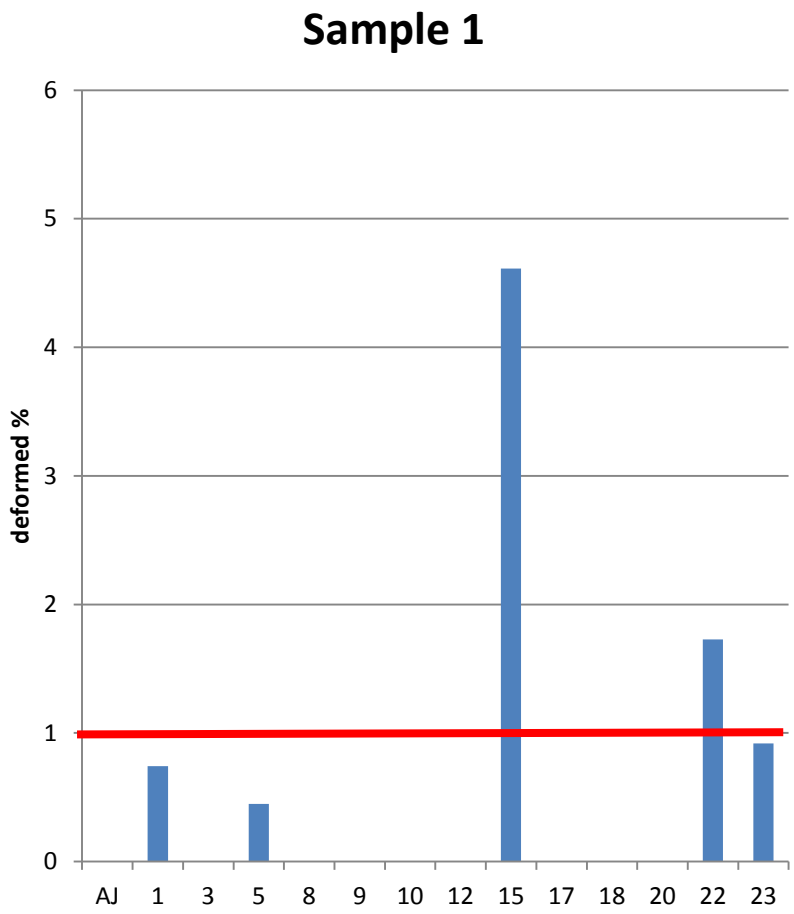
Both categories to be separated into ”weak abnormality” and ”strong abnormality”.

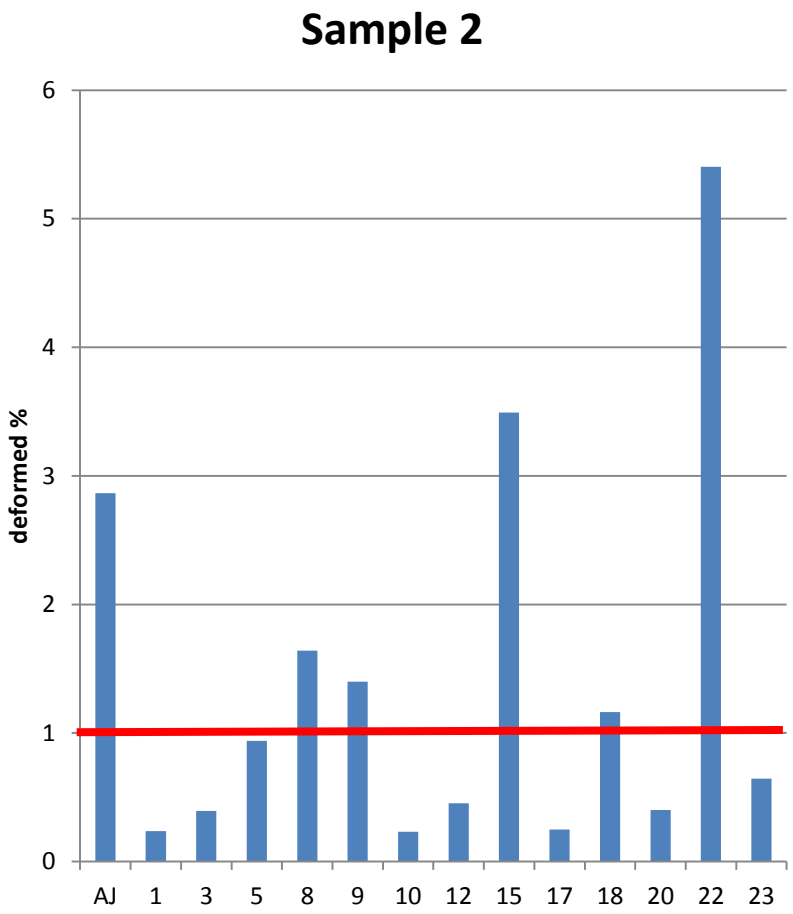




* Developed together with Medins Biologi AB and Amelie Jarlman

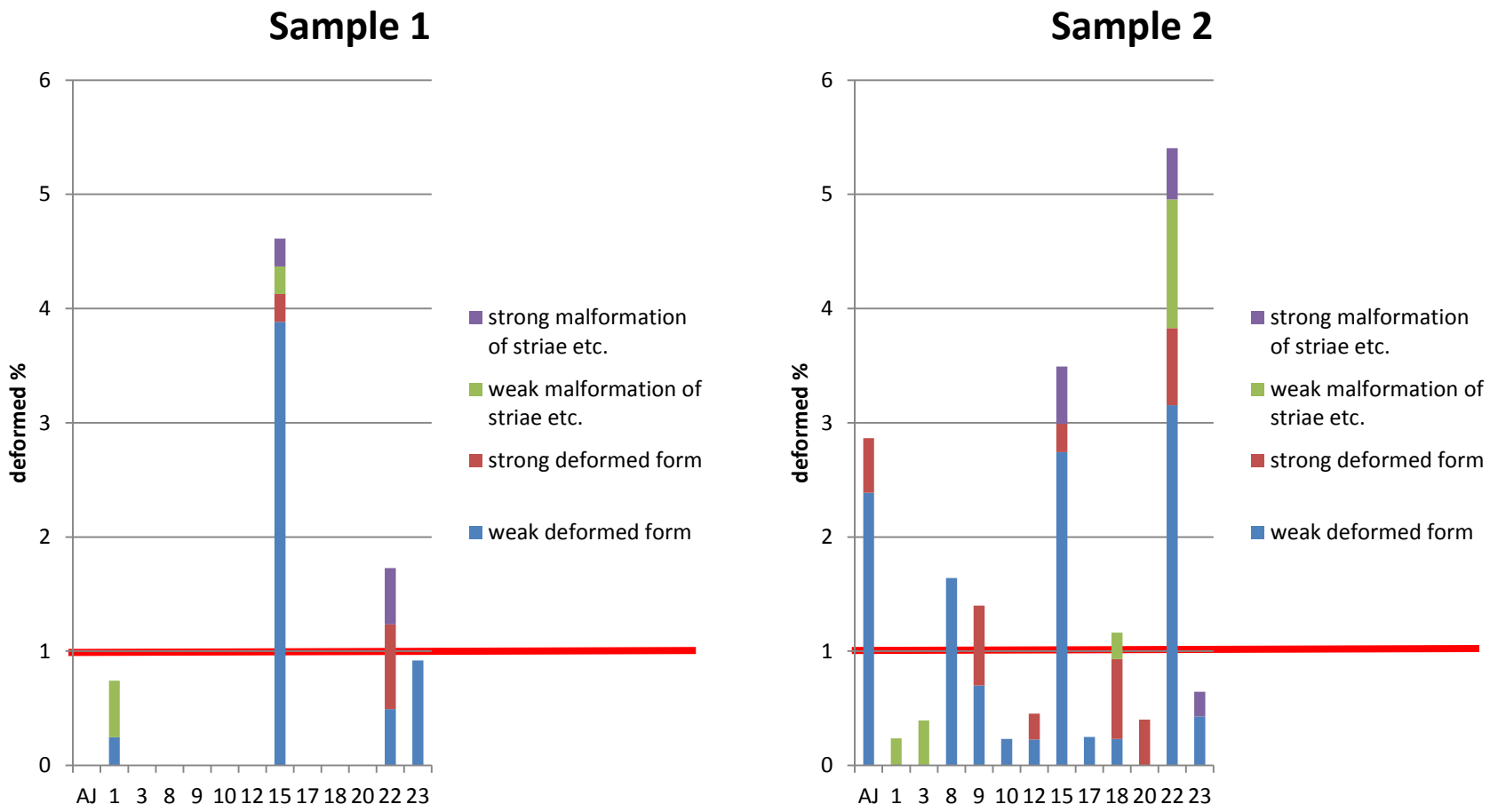
Deformations – Swedish pilot method



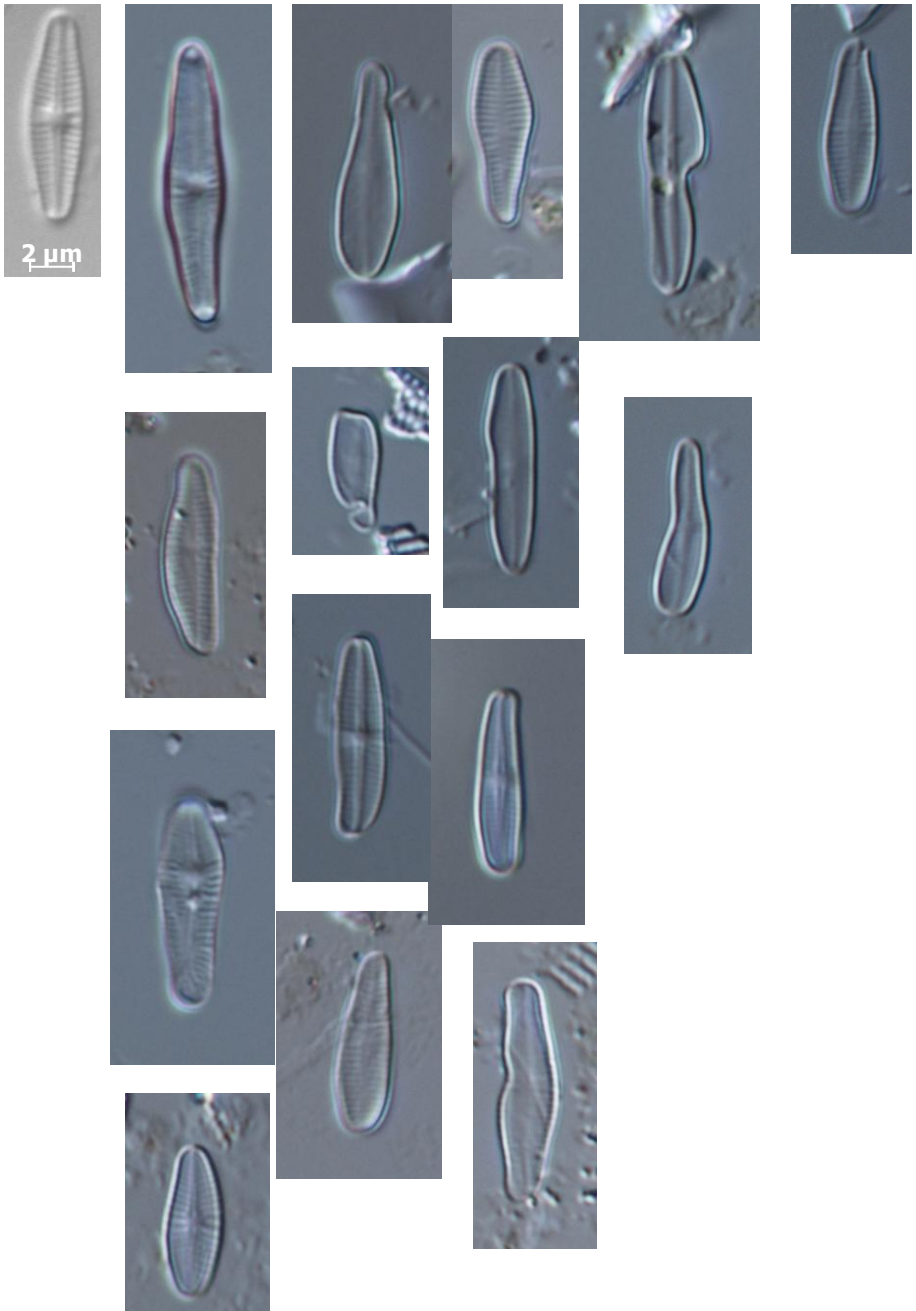


http://www.lansstyrelsen.se/blekinge/Sv/publikationer/rapporter/2012/Pages/201212.aspx

Deformations – Swedish pilot method



http://www.lansstyrelsen.se/blekinge/Sv/publikationer/rapporter/2012/Pages/201212.aspx



Pictures:
M. Kahlert

Pictures AMIN/Eunotia: Amelie Jarlman

Last, but maybe not least…

Brachysira neoexilis

Pictures: Brachysira neoexilis

Brachysira vitrea