NMBAQC
The National Marine Biological Analytical Quality Control Scheme

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Quality Control Scheme

Year 16

Rocky Shore Macroalgal identification

Ring Test RT04

Queen's University Belfast

Drafted June 2010; finalized December 2010

Ring Test Details

Ring Test – RT04
Type – Rocky shore algae
Circulated - enter as appropriate
Completion Date – enter as appropriate
Number of participating laboratories - 10
Number of completed tests received - 21

Table 1: Summary of differences

			Total differences for 21 participants		
Specimen	**Genera**	**Species**	**Genus**	**Species**	
1	*Cladophora*	*rupestris*	0	0	
2	*Himanthalia*	*elongata*	0	0	
3	*Polysiphonia*	*lanosa*	0	0	
4	*Fucus*	*vesiculosus*	0	0	
5	*Fucus*	*spiralis*	1	1	
6	*Spongomorpha*	*arcta*	0*	0	
7	*Cryptopleura*	*ramosa*	1	2	
8	*Alaria*	*esculenta*	0	0	
9	*Ulva*	*compressa*	0**	4	
10	*Dilsea*	*carnosa*	0	0	
11	*Sargassum*	*muticum*	0	0	
12	*Chondrus*	*crispus*	2	2	
13	*Pilayella*	*littoralis*	14	14	
14	*Fucus*	*ceranoides*	3	4	
15	*Codium*	*fragile* *susp. fragile*	0	0	3
16	*Polysiphonia*	*atlantica*	0	13	
17	*Osmundea*	*pinnatifida*	0***	3	
18	*Ahnfeltia*	*plicata*	7	7	
19	*Odonthalia*	*dentata*	0	0	
20	*Dumontia*	*contorta*	4	4	
Total Differences			**32**	**54**	**3**

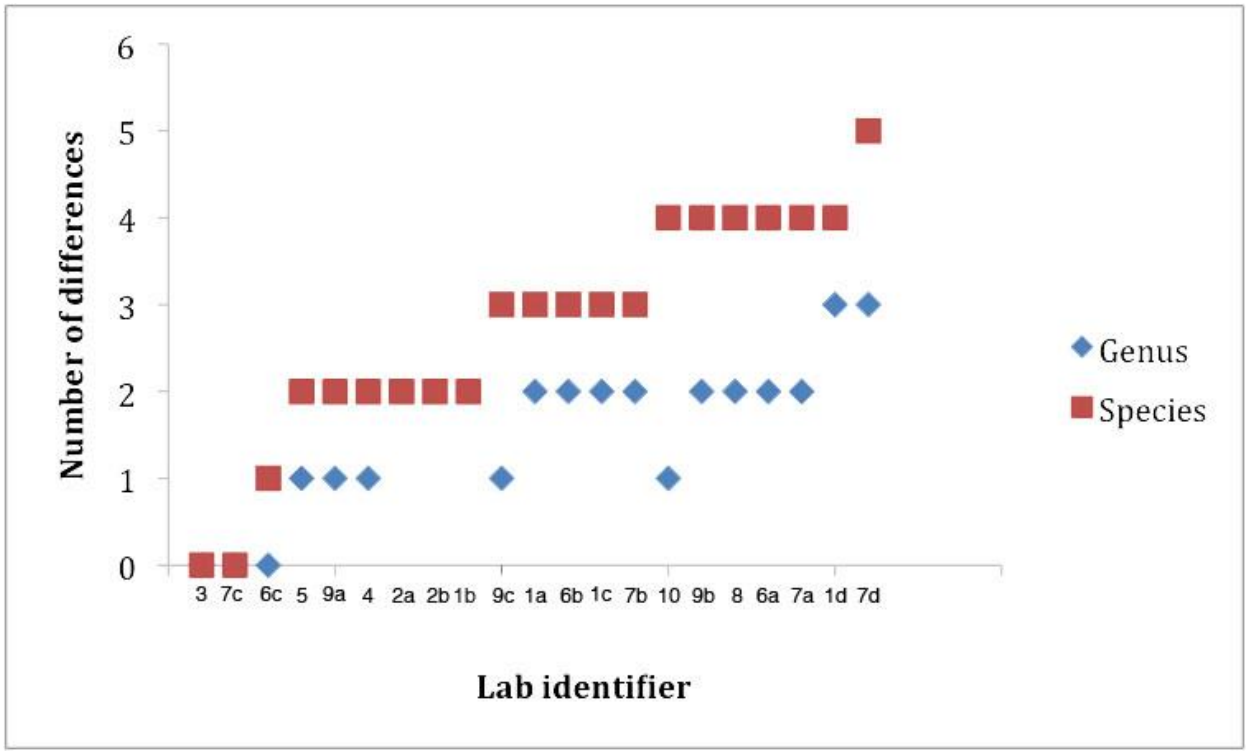
* *Acrosiphonia arcta* was accepted for *Spongomorpha arcta*
** *Enteromorpha compressa* was accepted for *Ulva compressa*
*** *Laurencia pinnatifida* was accepted for *Osmundea pinnatifida*

Table 2:

	Participant (lab code; temporary code for ring test below)																				
	MA 1712				**MA 1705**		**MA 1703**	**MA 1714**	**MA 1710**	**MA 1704**			**MA 1716**				**MA 1713**	**MA 1715**			**MA 1707**
Specimen	1a	1b	1c	1d	2a	2b	3	4	5	6a	6b	6c	7a	7b	7c	7d	8	9a	9b	9c	10
1.Cladophora rupestris																					
2.Himanthalia elongata																					
3.Polysiphonia lanosa																					
4.Fucus vesiculosus																					
5.Fucus spiralis																x					
6.Spongomorpha arcta	*	*	*	*		*	*	*								*		*	*	*	
7.Cryptopleura ramosa																			x		
8.Alaria esculenta																					
9.Ulva compressa				x									x	x		**	**		x		x
10.Dilsea carnosa																					
11.Sargassum muticum																					
12.Chondrus crispus										x	x										
13.Pilayella littoralis	x	x	x	x				x	x		x		x	x		x	x	x	x	x	
14.Fucus ceranoides			x	x												x	x				
15.Codium fragile subsp. fragile																x				x	x
16.Polysiphona atlantica	x		x	x				x	x	x	x					x	x	x	x	x	x
17.Osmundea pinnatifida									x	x		x	***								
18.Ahnfeltia plicata	x	x			x	x				x				x							x
19.Odonthalia dentata																					

20.Dumontia contorta					x	x							x				x				

* *Acrosiphonia arcta* was accepted for *Spongomorpha arcta*
** *Enteromorpha compressa* was accepted for *Ulva compressa*
*** *Laurencia pinnatifida* was accepted for *Osmundea pinnatifida*



Errata

1a – 8. esculente*, 13. *Ectocarpus fasciculatus*, 16.*Poylsiphonia harveyi*, 17, osmundia*, 18. *Polyides rotundus*.
1b – 13. *Ectocarpus* sp., 18. *Gymnogongrus griffithsiae*.
1c – 13. *Ectocarpus fasciculatus*, 14. *Mastocarpus stellatus*, 16. *Polysiphonia fucoides, 19.* dentate*.
1d – 8. esculente*, 9. *Enteromorpha* sp., 13. *Ectocarpus* sp., 14. *Mastocarpus stellatus*, 16. *Polysiphonia fucoides*.
2a – 18. *Polyides rotundus*, 20. *Rhodomela confervoides*.
2b – 18. *Polyides rotundus*, 19. Odonthalis*, 20. *Rhodomela conferviodes*.
3 – 11. mutican*.
4 – 13. *Ectocarpus siliculosus*, 16. *Polysiponia fibrata*.
5 – 2. Himenthalia*, 13. *Ectocarpus fasciculatus*, 16. *Polysiphonia fibrata, 17. Osmundea omunda.*
6a – 12. *Mastocarpus stellatus*, 16. *Polysiphonia stricta*, 17. *Osmundea* sp., 18. *Gelidium pusillum.*
6b – 12. *Mastocarpus stellatus*, 13. *Ectocarpus fasciculatus*, 16. *Polysiphonia stricta*.
6c – 8. esculente*, 17. *Osmundea* sp.
7a – 9. *Enteromorpha intestinalis*, 13. *Ectocarpus siliculosis,* 20. *Lomentaria clavellosa*.
7b – 9. *Ulva intestinalis*, 13. *Spongonema tomentosum*, 18. *Polyides rotundus*.
7c – no corrections.
7d – 5. *Pelvetia canaliculata,* 13. *Ectocarpus siliculosus*, 14. *Mastocarpus stellatus*, 15. *Codium fragile* subsp. tomentosoides, 16. *Polysiphonia nodosum*.
8 – 13. *Ectocarpus siliculosus*, 14. *Fucus distichus*, 16. *Polysiphonia fibrata*, 20. *Gelidium pusillum*.
9a – 7. racemosa*, 13. *Ectocarpus siliculosus*, 16. *Polysiphonia stricta* (=*P*. *urceolata*).
9b – 7. *Callophyllis laciniata*, 9. *Ulva intestinalis*, 13. *Ectocarpus siliculosus*, 16. *Polysiphonia stricta*.
9c – 13. Ectocarpus siliculosus, 15. no subspecies, 16. Polysiphonia stricta.
10 – 9. *Ulva intestinalis*, 15. *Codium fragile subsp. tomentosoides*, 16. *Polysiphonia fibrata*, 18. *Furcellaria lumbricalis*.

Acrosiphonia arcta used by – 1a, 1b, 1c, 1d,2b, 3, 4, 7d, 9a, 9b,9c
Enteromorpha compressa used by – 7d, 8,
Laurencia pinnatifida used by – 7a

* spelling errors. These are likely to the result of people having autcorrect on their grammar and spelling. You will have to switch it off, so as not to get names constantly being “corrected”.

Details of misidentifications

1. *Cladophora rupestris*
No differences in identification

2. *Himanthalia elongata*
No differences in identification

3. *Polysiphonia lanosa*
No differences in identification

4. *Fucus vesiculosus*
No differences in identification

5. *Fucus spiralis*
One generic and specific difference, 7d recorded as *Pelvetia canaliculata. Pelvetia* differs in having

a distinctly channelled thallus without midribs and with axes less than 8 mm wide whereas F. spiralis has axes flattened, more than 10 mm wide and with a midrib.

6. *Spongomorpha arcta*
All identified as either *Spongomorpha* or *Acrosiphonia arcta* [OK, this is just a nomenclatural change]

7. *Cryptopleura ramosa*
One generic and one specific difference, 9b recorded as *Callophyllis laciniata* [a thick almost fleshy seaweed that shows large medullary cells in cross-section, whereas *Cryptopleura* is more cellophane/papery in texture and is one cell thick.

8. *Alaria esculenta*
No differences in identification

9. *Ulva compressa*
No generic differences (all identified as *Ulva* or *Enteromorpha*), 1d didn't identify to species level and 7a, 7b, 9b and 10 identified as *U*. or *E. intestinalis.* The key discriminating feature between *U. compressa* and *U. intestinalis* is branching: *U. intestinalis* is not branched except at unusually low salinity whereas *U. compressa* is typically branched and rather flattened.

10. *Dilsea carnosa*
No differences in identification

11. *Sargassum muticum*
No differences in identification

12. *Chondrus crispus*
Two generic and two specific differences, 6a and 6b recorded as *Mastocarpus stellatus.* This was possibly a bit confusing - there seemed to be some *Mastocarpus* in the corner of one of the photos. *Chondrus* is typically flat, often iridescent, whereas *Mastocarpus* is channelled. The presence of reproductive structures is unequivocal: *Mastocarpus* has "grape-pip" like female papillae whereas in *Chondrus* the cystocarps are embedded in the blades.

13. *Pilayella littoralis*
Fourteen generic and fourteen specific differences, 1b and 1d recorded as *Ectocarpus sp*.; 1a, 1c, 5 and 6b recorded as *Ectocarpus fasciculatus*; 4, 7a, 7d, 8, 9a, 9b and 9c recorded as *Ectocarpus siliculosis*; 7b recorded as *Spongonema tomentosum*
Pilayella: diagnostic character is intercalary sporangia - they are in a row that terminates in non-reproductive cells. This is a unique feature. Also, *Pilayella* has opposite branching.

14. *Fucus ceranoides*
Three generic and four specific differences, 1c, 1d and 7d recorded as *Mastocarpus stellatus* and 8 as *Fucus distichus. Mastocarpus* is a channelled red alga. *Fucus ceranoides* is usually identifiable by bladder-like inflations along either side of the midrib and its occurrence in low salinity.

15. *Codium fragile subsp. fragile*
Three subspecific differences, 9c had no subspecies and 7c and 10 recorded subspecies as *tomentosoides.* Those are OK - it's a nomenclatural change (correct name subsp. *fragile*)

16. *Polysiphonia atlantica*

Thirteen specific differences, 1a recorded as *P. harveyi*; 1c and 1d as *P. fucoides*; 4, 5, 8 and 10 as *P. fibrata*; 6a, 6b, 9a, 9b and 9c as *P. stricta* and 7d as *P. nodosum*
Photos were not sufficiently informative for some participants. *P. atlantica* grows on intertidal bedrock or limpets and has 4 pericentral cells with no cortication. *P. stricta* is similar but axes are wider and all reproductive features are much larger *P. harveyi* is epiphytic, and under the microscope has distinct "glass-like" cells because the plastids are on side walls of cells. *P. fucoides* is robust, with 11-21 pericentral cells and often corticated.

17. *Osmundea pinnatifida*
Three specific differences, 6a and 6c did not record to species level and 5 recorded as *O. osmunda*
O. osmunda has a solid crustose holdfast and thalli grow as individuals, unlike *O. pinnatifida* in which the turf-forming axes are attached by a branching holdfast with prostrate axes.

18. *Ahnfeltia plicata*
Seven generic and seven specific differences, 1a, 2a, 2b and 7b recorded as *Polyides rotundus;* 1b as *Gymnogongrus griffithsiae;* 6a as *Gelidium pusillum* and 10 as *Furcellaria lumbricalis*
Polyides rotundus and *Furcellaria lumbricalis* axes are much wider than those of *Ahnfeltia* (to about 3 mm vs. <1 mm); *Gymnogongrus griffithsiae* axes are also wider than *Ahnfeltia* (to about 2 mm vs. <1 mm); *Gelidium pusillum* is flattened and irregularly rather than dichotomously branched.

19. *Odonthalia dentata*
No differences in identification.

20. *Dumontia contorta*
Four generic and four specific differences 2a and 2b recorded as *Rhodomela confervoides*; 7a as *Lomentaria clavellosa* and 8 as *Gelidium pusillum*
Rhodomela confervoides and *Gelidium pusillum* have solid rather than hollow axes. *L. clavellosa* is regularly pinnately branched whereas *Dumontia* is only occasionally branched, only in the lower thallus.

Scoring was 1 mark for genus and same for species, answers with minor typos/spelling mistakes were accepted but detailed in erratum. Full marks were awarded for out of date nomenclature as detailed in Tables 1 & 2. *Codium fragile subsp. fragile* had 0.5 marks for species and subspecies. Total possible score was 40.

Table 3: Candidate scores

Temporary code	Lab code	Candidate score		Mean/Total lab score	
1a	MA1712	35	87.5%		
1b	MA1712	36	90%		
1c	MA1712	34	85%		
1d	MA1712	33	82.5%		
1	MA1712			34.5	86.25%
2a	MA1705	36	90%		
2b	MA1705	36	90%		
2	MA1705			36	90%

3	MA1703	40	100%	40	100%
4	MA1714	37	93%	37	93%
5	MA1710	36	90%	36	90%
6a	MA1704	32	80%		
6b	MA1704	35	88%		
6c	MA1704	39	96%		
6	MA1704			35.3	88%
7a	MA1716	35	88%		
7b	MA1716	34	85%		
7c	MA1716	40	100%		
7d	MA1716	32.5	81%		
7	MA1716			35.4	88%
8	MA1713	34	85%	34	85%
9a	MA1715	36	90%		
9b	MA1715	34	85%		
9c	MA1715	36.5	91%		
9	MA1715			35.5	89%
10	MA1707	34.5		34.5	

Appendix

Table 4: Summary of feedback

Question	yes	no
1. Were there sufficient photos per specimen?	7	2
Some species would have been easier to identify with more or clearer photos		
2. Did the photos cover habitats and key feature well enough?	7	5
Species 17 in particular needed clearer photos of key features		
3. Were the photos of sufficient quality to make out key features?	9	3
Species 17 & 18 problematic and more microscopic photos needed in general		
4. Was the amount of supplementary information sufficient?	5	4
More info on habitat, a scale on photos and a description of physical characteristics		
5. Was the difficulty of the taxa chosen at the right level	8	4

Four candidates/labs found the test a little easy, one thought the test difficult as some species rare in Norway	
6. How long did the test take to complete?	4.75 hours on average
General comments	
More species in the test, clearer instructions and detailed feedback requested	