NMBAQC

NE Atlantic Marine Biological Analytical Quality Control Scheme

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Ring Test Bulletin – RTB#52

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RING TEST DETAILS

Ring Test #52

Type/Contents – Targeted - Bivalvia

Circulated – 12/11/16

Results deadline – 16/12/16

Number of Subscribing Laboratories – 24

Number of Participating Laboratories – 21

Number of Results Received – 21*

***multiple data entries per laboratory permitted**

Summary of differences

Specimen	Genus	Species	Size	Total differences for 21 returns	
				Genus	Species
RT5201	*Thyasira*	*flexuosa*	2-3mm	0	1
RT5202	*Abra*	*alba*	10mm	0	1
RT5203	*Cochlodesma*	*praetenue*	3-5mm	5	5
RT5204	*Thyasira*	*equalis*	2-4mm	3	9
RT5205	*Abra*	*nitida*	4-6mm	0	1
RT5206	*Fabulina*	*fabula*	3-5mm	1	1
RT5207	*Cerastoderma*	*edule*	1mm	6	13
RT5208	*Tellimya*	*ferruginosa*	3-4mm	0	0
RT5209	*Nucula*	*nucleus*	8-9mm	0	3
RT5210	*Nucula*	*nitidosa*	2-3mm	1	3
RT5211	*Asbjornsenia*	*pygmaea*	2-3mm	1	1
RT5212	*Abra*	*prismatica*	3-5mm	1	1
RT5213	*Chamelea*	*striatula*	3-4mm	7	9
RT5214	*Montacuta*	*substriata*	1-2mm	5	5
RT5215	*Spisula*	*subtruncata*	1mm	4	6
RT5216	*Adontorhina*	*similis*	1-2mm	4	4
RT5217	*Goodallia*	*triangularis*	1-2mm	0	0
RT5218	*Scrobicularia*	*plana*	1mm	20	20
RT5219	*Cerastoderma*	*edule*	2-3mm	9	13
RT5220	*Arctica*	*islandica*	1mm	4	4
RT5221	*Kurtiella*	*bidentata*	2-3mm	2	2
RT5222	*Venerupis*	*corrugata*	2-3mm	9	9
RT5223	*Barnea*	*parva*	10-20mm	0	0
RT5224	*Abra*	*alba*	4-5mm	1	2
RT5225	*Nucula*	*nucleus*	2mm	0	11
			Total differences	83	124
			Average differences /lab.	4.0	5.9

Figure 1. The number of differences from the AQC identification of specimens distributed in RT52 for each of the participating laboratories. Arranged in order of increasing number of differences (by specific followed by generic errors).

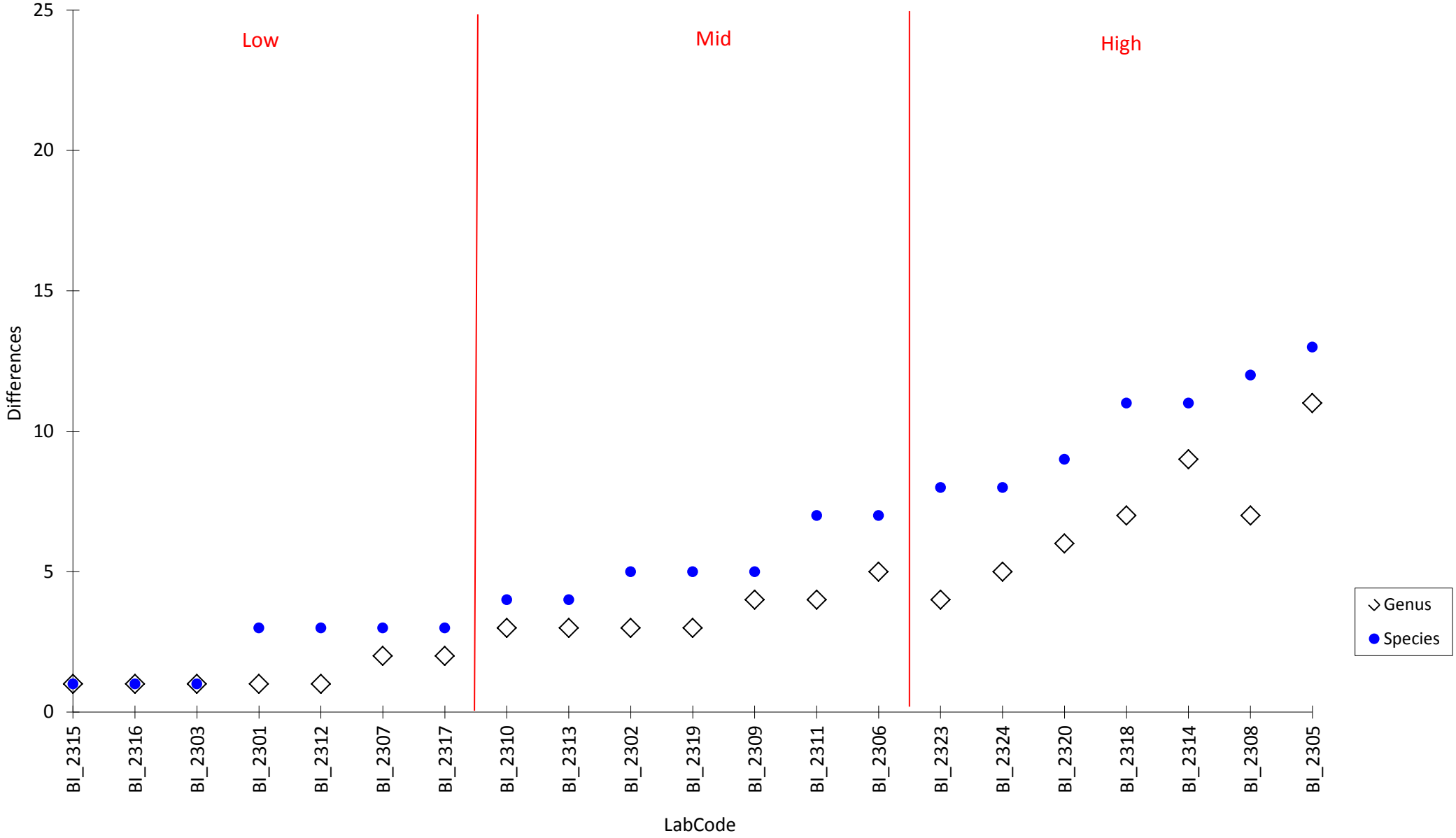

Table 1. The identification of fauna made by participating laboratories for RT52 (arranged by specimen). Names are given only where different from the AQC identification.

	RT5201	RT5202	RT5203	RT5204	RT5205
Taxon	*Thyasira flexuosa*	*Abra alba*	*Cochlodesma praetenue*	*Thyasira equalis*	*Abra nitida*
BI_2301	- -	- -	- -	- -	- -
BI_2302	- -	- -	- -	- sarsii	- -
BI_2303	- -	- -	- -	- -	- -
BI_2305	- -	- nitida	Thracia gracilis	Axinulus croulinensis	- alba
BI_2306	- -	- -	- -	Axinulus croulinensis	- -
BI_2307	- -	- -	- -	- -	- -
BI_2308	- -	- -	- -	Lucinoma borealis	- -
BI_2309	- -	- -	Thracia gracilis	- -	- -
BI_2310	- -	- -	Thracia phaseolina	- -	- -
BI_2311	- -	- -	- -	- sarsi	- -
BI_2312	- -	- -	- -	- -	- -
BI_2313	- -	- -	- -	- -	- -
BI_2314	- -	- -	Thracia phaseolina	- sarsii	- -
BI_2315	- -	- -	- -	- -	- -
BI_2316	- -	- -	- -	- -	- -
BI_2317	- -	- -	- -	- -	- -
BI_2318	- [Thyasira flexuosa]	- -	- -	- Thyasira sarsi	- -
BI_2319	- -	- -	- -	- -	- -
BI_2320	- sarsii	- -	Thracia phaseolina	- flexuosa	- -
BI_2323	- -	- -	- -	[Thracia] sarsii	- -
BI_2324	- -	- -	- -	- -	- -

Table 1. The identification of fauna made by participating laboratories for RT52 (arranged by specimen). Names are given only where different from the AQC identification.

	RT5206	RT5207	RT5208	RT5209	RT5210
Taxon	*Fabulina fabula*	*Cerastoderma edule*	*Tellimya ferruginosa*	*Nucula nucleus*	*Nucula nitidosa*
BI_2301	- -	- glaucum	- -	- -	- -
BI_2302	- -	Parvicardium exiguum	- -	- -	- -
BI_2303	- -	- -	- -	- -	- -
BI_2305	- -	Parvicardium pinnulatus	- -	- -	- -
BI_2306	- -	Parvicardium minimum	- -	- -	- -
BI_2307	- -	- -	- -	- -	- -
BI_2308	Macomangulus tenuis	- glaucum	- -	- nitidosa	- nucleus
BI_2309	[Tellina] -	- glaucum	- -	- -	- -
BI_2310	- -	- -	- -	- -	- -
BI_2311	[Tellina] -	- -	- -	- nitidosa	- -
BI_2312	- -	- glaucum	- -	- -	- -
BI_2313	- -	- glaucum	- -	- -	- -
BI_2314	- -	- -	- -	- -	Ennucula tenuis
BI_2315	- -	- -	- -	- -	- -
BI_2316	- -	- -	- -	- -	- -
BI_2317	- -	- -	- -	- hanleyi	- -
BI_2318	- -	Parvicardium pinnulatum	- -	- -	- hanleyi
BI_2319	- -	Parvicardium exiguum	- -	- -	- -
BI_2320	- -	Timoclea ovata	- -	- -	- -
BI_2323	- -	- glaucum	- -	- -	- -
BI_2324	- -	- glaucum	- -	- -	- -

Table 1. The identification of fauna made by participating laboratories for RT52 (arranged by specimen). Names are given only where different from the AQC identification.

	RT5211	RT5212	RT5213	RT5214	RT5215
Taxon	*Asbjornsenia pygmaea*	*Abra prismatica*	*Chamelea striatula*	*Montacuta substriata*	*Spisula subtruncata*
BI_2301	- -	- -	- -	- -	- -
BI_2302	- -	- -	- -	- -	- -
BI_2303	- -	- -	- -	- -	- -
BI_2305	- -	- -	Clausinella fasciata	- -	Mendicula ferruginosa
BI_2306	- -	- -	- gallina	- -	- -
BI_2307	- -	- -	- -	- -	- -
BI_2308	- -	Macomangulus tenuis	Venus casina	Epilepton clarkiae	- elliptica
BI_2309	[Tellina] -	- -	- -	Epilepton clarkiae	- -
BI_2310	- -	- -	- -	- -	- -
BI_2311	[Moerella] -	- -	- -	- -	Mactra stultorum
BI_2312	- -	- -	- -	- -	- -
BI_2313	- -	- -	Astarte sulcata	- -	- -
BI_2314	- -	- -	Astarte sulcata	- -	Limecola balthica
BI_2315	- -	- -	- -	- -	- -
BI_2316	- -	- -	- -	- -	- -
BI_2317	[Moerella] -	- -	Venus casina	- -	- -
BI_2318	- -	- -	Astarte sulcata	Epilepton clarkiae	- -
BI_2319	- -	- -	- -	- -	- solida
BI_2320	Macomangulus tenuis	- -	- -	- -	- -
BI_2323	- -	- -	- gallina	Epilepton clarkiae	- -
BI_2324	- -	- -	Clausinella fasciata	Lasaea adansoni	Mactra stultorum

Table 1. The identification of fauna made by participating laboratories for RT52 (arranged by specimen). Names are given only where different from the AQC identification.

	RT5216	RT5217	RT5218	RT5219	RT5220
Taxon	*Adontorhina similis*	*Goodallia triangularis*	*Scrobicularia plana*	*Cerastoderma edule*	*Arctica islandica*
BI_2301	- -	- -	Abra tenuis	- glaucum	- -
BI_2302	- -	- -	Abra tenuis	Parvicardium scabrum	- -
BI_2303	- -	- -	Abra tenuis	- -	- -
BI_2305	Mendicula pygmaea	- -	Hemilepton nitidum	Acanthocardia echinata	Kellia suborbicularis
BI_2306	- -	- -	Abra tenuis	Parvicardium minimum	- -
BI_2307	- -	- -	Abra tenuis	- -	- -
BI_2308	Kellia suborbicularis	- -	Abra tenuis	- glaucum	- -
BI_2309	- -	- -	Abra tenuis	- -	- -
BI_2310	- -	- -	Abra sp.	- -	- -
BI_2311	- -	- -	Kurtiella bidentata	Parvicardium ovale	- -
BI_2312	- -	- -	- -	- -	- -
BI_2313	- -	- -	Kurtiella bidentata	Parvicardium pinnulatum	- -
BI_2314	Epilepton clarkiae	- -	Hemilepton nitidum	Parvicardium exiguum	Kellia suborbicularis
BI_2315	- -	- -	Mya arenaria	- -	- -
BI_2316	- -	- -	Abra tenuis	- -	- -
BI_2317	- -	- -	Abra tenuis	- -	- -
BI_2318	- -	- -	Abra alba	Acanthocardia echinata	Gouldia minima
BI_2319	- -	- -	Abra tenuis	- glaucum	Kellia suborbicularis
BI_2320	Mendicula pygmaea	- -	Abra tenuis	Parvicardium pinnulatum	- -
BI_2323	- -	- -	Spisula juv	Parvicardium pinnulatum	- -
BI_2324	- -	- -	Limecola balthica	- glaucum	- -

Table 1. The identification of fauna made by participating laboratories for RT52 (arranged by specimen). Names are given only where different from the AQC identification.

	RT5221	RT5222	RT5223	RT5224	RT5225
Taxon	*Kurtiella bidentata*	*Venerupis corrugata*	*Barnea parva*	*Abra alba*	*Nucula nucleus*
BI_2301	- -	- -	- -	- -	- -
BI_2302	- -	- -	- -	- -	- nitidosa
BI_2303	- -	[Tapes] -	- -	- -	- -
BI_2305	Tellimya ferruginosa	Kurtiella bidentata	- -	- -	- -
BI_2306	Tellimya ferruginosa	[Polititapes] -	- -	- -	- nitidosa
BI_2307	- -	Polititapes rhomboides	- -	- -	- nitidosa
BI_2308	- -	- -	- -	- -	- -
BI_2309	- -	Kurtiella bidentata	- -	- -	- -
BI_2310	- -	- -	- -	Scrobicularia plana	- sulcata
BI_2311	- -	Tapes rhomboides	- -	- -	- hanleyi
BI_2312	- -	Polititapes rhomboides	- -	- -	- hanleyi
BI_2313	- -	- -	- -	- -	- -
BI_2314	- -	Tellimya ferruginosa	- -	- -	- nitidosa
BI_2315	- -	- -	- -	- -	- -
BI_2316	- -	- -	- -	- -	- -
BI_2317	- -	- -	- -	- -	- -
BI_2318	- -	Tellimya ferruginosa	- -	- prismatica	- nitidosa
BI_2319	- -	- -	- -	- -	- -
BI_2320	- -	- [senegalensis]	- -	- -	- hanleyi
BI_2323	- -	Kurtiella bidentata	- -	- -	- hanleyi
BI_2324	- -	Polititapes rhomboides	- -	- -	- nitidosa

Table 2. The identification of fauna made by participating laboratories for RT52 (arranged by participant). Names are given only where different from the AQC identification.

	Taxon	BI_2301	BI_2302	BI_2303	BI_2305	BI_2306	BI_2307	BI_2308
RT5201	*Thyasira flexuosa*	- -	- -	- -	- -	- -	- -	- -
RT5202	*Abra alba*	- -	- -	- -	- nitida	- -	- -	- -
RT5203	*Cochlodesma praetenue*	- -	- -	- -	Thracia gracilis	- -	- -	- -
RT5204	*Thyasira equalis*	- -	- sarsii	- -	Axinulus croulinensis	Axinulus croulinensis	- -	Lucinoma borealis
RT5205	*Abra nitida*	- -	- -	- -	- alba	- -	- -	- -
RT5206	*Fabulina fabula*	- -	- -	- -	- -	- -	- -	Macomangulus tenuis
RT5207	*Cerastoderma edule*	- glaucum	Parvicardium exiguum	- -	Parvicardium pinnulatus	Parvicardium minimum	- -	- glaucum
RT5208	*Tellimya ferruginosa*	- -	- -	- -	- -	- -	- -	- -
RT5209	*Nucula nucleus*	- -	- -	- -	- -	- -	- -	- nitidosa
RT5210	*Nucula nitidosa*	- -	- -	- -	- -	- -	- -	- nucleus
RT5211	*Asbjornsenia pygmaea*	- -	- -	- -	- -	- -	- -	- -
RT5212	*Abra prismatica*	- -	- -	- -	- -	- -	- -	Macomangulus tenuis
RT5213	*Chamelea striatula*	- -	- -	- -	Clausinella fasciata	- gallina	- -	Venus casina
RT5214	*Montacuta substriata*	- -	- -	- -	- -	- -	- -	Epilepton clarkiae
RT5215	*Spisula subtruncata*	- -	- -	- -	Mendicula ferruginosa	- -	- -	- elliptica
RT5216	*Adontorhina similis*	- -	- -	- -	Mendicula pygmaea	- -	- -	Kellia suborbicularis
RT5217	*Goodallia triangularis*	- -	- -	- -	- -	- -	- -	- -
RT5218	*Scrobicularia plana*	Abra tenuis	Abra tenuis	Abra tenuis	Hemilepton nitidum	Abra tenuis	Abra tenuis	Abra tenuis
RT5219	*Cerastoderma edule*	- glaucum	Parvicardium scabrum	- -	Acanthocardia echinata	Parvicardium minimum	- -	- glaucum
RT5220	*Arctica islandica*	- -	- -	- -	Kellia suborbicularis	- -	- -	- -
RT5221	*Kurtiella bidentata*	- -	- -	- -	Tellimya ferruginosa	Tellimya ferruginosa	- -	- -
RT5222	*Venerupis corrugata*	- -	- -	[Tapes] -	Kurtiella bidentata	[Polititapes] -	Polititapes rhomboides	- -
RT5223	*Barnea parva*	- -	- -	- -	- -	- -	- -	- -
RT5224	*Abra alba*	- -	- -	- -	- -	- -	- -	- -
RT5225	*Nucula nucleus*	- -	- nitidosa	- -	- -	- nitidosa	- nitidosa	- -

Table 2. The identification of fauna made by participating laboratories for RT52 (arranged by participant). Names are given only where different from the AQC identification.

	Taxon	BI_2309	BI_2310	BI_2311	BI_2312	BI_2313	BI_2314	BI_2315
RT5201	*Thyasira flexuosa*	- -	- -	- -	- -	- -	- -	- -
RT5202	*Abra alba*	- -	- -	- -	- -	- -	- -	- -
RT5203	*Cochlodesma praetenue*	Thracia gracilis	Thracia phaseolina	- -	- -	- -	Thracia phaseolina	- -
RT5204	*Thyasira equalis*	- -	- -	- sarsi	- -	- -	- sarsii	- -
RT5205	*Abra nitida*	- -	- -	- -	- -	- -	- -	- -
RT5206	*Fabulina fabula*	[Tellina] -	- -	[Tellina] -	- -	- -	- -	- -
RT5207	*Cerastoderma edule*	- glaucum	- -	- -	- glaucum	- glaucum	- -	- -
RT5208	*Tellimya ferruginosa*	- -	- -	- -	- -	- -	- -	- -
RT5209	*Nucula nucleus*	- -	- -	- nitidosa	- -	- -	- -	- -
RT5210	*Nucula nitidosa*	- -	- -	- -	- -	- -	Ennucula tenuis	- -
RT5211	*Asbjornsenia pygmaea*	[Tellina] -	- -	[Moerella] -	- -	- -	- -	- -
RT5212	*Abra prismatica*	- -	- -	- -	- -	- -	- -	- -
RT5213	*Chamelea striatula*	- -	- -	- -	- -	Astarte sulcata	Astarte sulcata	- -
RT5214	*Montacuta substriata*	Epilepton clarkiae	- -	- -	- -	- -	- -	- -
RT5215	*Spisula subtruncata*	- -	- -	Mactra stultorum	- -	- -	Limecola balthica	- -
RT5216	*Adontorhina similis*	- -	- -	- -	- -	- -	Epilepton clarkiae	- -
RT5217	*Goodallia triangularis*	- -	- -	- -	- -	- -	- -	- -
RT5218	*Scrobicularia plana*	Abra tenuis	Abra sp.	Kurtiella bidentata	- -	Kurtiella bidentata	Hemilepton nitidum	Mya arenaria
RT5219	*Cerastoderma edule*	- -	- -	Parvicardium ovale	- -	Parvicardium pinnulatum	Parvicardium exiguum	- -
RT5220	*Arctica islandica*	- -	- -	- -	- -	- -	Kellia suborbicularis	- -
RT5221	*Kurtiella bidentata*	- -	- -	- -	- -	- -	- -	- -
RT5222	*Venerupis corrugata*	Kurtiella bidentata	- -	Tapes rhomboides	Polititapes rhomboides	- -	Tellimya ferruginosa	- -
RT5223	*Barnea parva*	- -	- -	- -	- -	- -	- -	- -
RT5224	*Abra alba*	- -	Scrobicularia plana	- -	- -	- -	- -	- -
RT5225	*Nucula nucleus*	- -	- sulcata	- hanleyi	- hanleyi	- -	- nitidosa	- -

Table 2. The identification of fauna made by participating laboratories for RT52 (arranged by participant). Names are given only where different from the AQC identification.

	Taxon	BI_2316	BI_2317	BI_2318	BI_2319	BI_2320	BI_2323	BI_2324
RT5201	*Thyasira flexuosa*	- -	- -	- [Thyasira flexuosa]	- -	- sarsii	- -	- -
RT5202	*Abra alba*	- -	- -	- -	- -	- -	- -	- -
RT5203	*Cochlodesma praetenue*	- -	- -	- -	- -	Thracia phaseolina	- -	- -
RT5204	*Thyasira equalis*	- -	- -	- sarsi	- -	- flexuosa	[Thracia] sarsii	- -
RT5205	*Abra nitida*	- -	- -	- -	- -	- -	- -	- -
RT5206	*Fabulina fabula*	- -	- -	- -	- -	- -	- -	- -
RT5207	*Cerastoderma edule*	- -	- -	Parvicardium pinnulatum	Parvicardium exiguum	Timoclea ovata	- glaucum	- glaucum
RT5208	*Tellimya ferruginosa*	- -	- -	- -	- -	- -	- -	- -
RT5209	*Nucula nucleus*	- -	- hanleyi	- -	- -	- -	- -	- -
RT5210	*Nucula nitidosa*	- -	- -	- hanleyi	- -	- -	- -	- -
RT5211	*Asbjornsenia pygmaea*	- -	[Moerella] -	- -	- -	Macomangulus tenuis	- -	- -
RT5212	*Abra prismatica*	- -	- -	- -	- -	- -	- -	- -
RT5213	*Chamelea striatula*	- -	Venus casina	Astarte sulcata	- -	- -	- gallina	Clausinella fasciata
RT5214	*Montacuta substriata*	- -	- -	Epilepton clarkiae	- -	- -	Epilepton clarkiae	Lasaea adansoni
RT5215	*Spisula subtruncata*	- -	- -	- -	- solida	- -	- -	Mactra stultorum
RT5216	*Adontorhina similis*	- -	- -	- -	- -	Mendicula pygmaea	- -	- -
RT5217	*Goodallia triangularis*	- -	- -	- -	- -	- -	- -	- -
RT5218	*Scrobicularia plana*	Abra tenuis	Abra tenuis	Abra alba	Abra tenuis	Abra tenuis	Spisula juv	Limecola balthica
RT5219	*Cerastoderma edule*	- -	- -	Acanthocardia echinata	- glaucum	Parvicardium pinnulatum	Parvicardium pinnulatum	- glaucum
RT5220	*Arctica islandica*	- -	- -	Gouldia minima	Kellia suborbicularis	- -	- -	- -
RT5221	*Kurtiella bidentata*	- -	- -	- -	- -	- -	- -	- -
RT5222	*Venerupis corrugata*	- -	- -	Tellimya ferruginosa	- -	- [senegalensis]	Kurtiella bidentata	Polititapes rhomboides
RT5223	*Barnea parva*	- -	- -	- -	- -	- -	- -	- -
RT5224	*Abra alba*	- -	- -	- prismatica	- -	- -	- -	- -
RT5225	*Nucula nucleus*	- -	- -	- nitidosa	- -	- hanleyi	- hanleyi	- nitidosa

Specimen Images and Detailed Breakdown of Identifications

LabCodes are abbreviated in this report to exclude the Scheme year, *i.e.* BI_2301 = Lab 01. An additional terminal character has been added within each LabCode (small case sequential letters) to permit multiple data entries from each laboratory, *i.e.* two participants from laboratory 01 would be coded as Lab 01a & Lab 01b. For details of your LabCode please contact your Scheme representative or APEM Ltd.

(Figure codes: A=anterior; P=posterior; L=lateral; D=dorsal; V=ventral)

RT5201 – *Thyasira flexuosa* (Figure 1a)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: Southwest England. Condition: Good, medium (2-3mm).

Fig. 1a. *Thyasira flexuosa* (RT5201) – L

Fig. 1b. *Thyasira sarsii* (9554) – L

One specific difference: Lab 20 identified as *Thyasira sarsii* (Figure 1b) (which has a more rounded outline with less pronounced auricle and sulci).

RT5202 – *Abra alba* (Figure 2a)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: Southwest England. Condition: Good, medium (c.10mm).

Fig. 2a. *Abra alba* (RT5102) – L

Fig. 2b. *Abra nitida* (56981) – L

One specific difference: Lab 05 identified as *Abra nitida* (Figure 2b) (which has a glossier, more elongated shell with the umbones closer to the midline).

RT5203 – *Cochlodesma praetenue* (Figure 3a)

Substratum: Sand. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: Eastern Scotland. Condition: Good, small (3-5mm).

Fig. 3a. *Cochlodesma praetenue* (RT5203) - L

Five generic and five specific differences: Labs 10, 14 and 20 identified as *Thracia phaseolina* (Figure 3g shows similarly sized specimen); Labs 05 and 09 identified as *T. gracilis* (no material available) (both of which lack tuberculate granulations on the posterior shell projection).

Figures 3b-3k show growth series of *C. praetunae* and *T. phaseolina*. The umbonal crack is not apparent in specimens below about 5mm. Note that the identity of the RT49 specimens (RT4919 remains uncertain; it was too small to show the tubercles.

Fig. 3b. *C. praetenue* (2mm) (55134) - L

Fig. 3c. *T. phaseolina* (2mm) (9726) - L

Fig. 3d. *C. praetenue* (2.5mm) (55147) - L

Fig. 3e. *T. phaseolina* (2.5mm) (9674) - L

Fig. 3f. *C. praetenue* (4.5mm) (55132) - L

Fig. 3g. *T. phaseolina* (4.5mm) (9666) - L

Fig. 3h. *C. praetenue* (5mm) (55147) - L

Fig. 3i. *T. phaseolina* (4.75mm) (9734) - L

Fig. 3j. *C. praetenue* (9mm) (55129) - L

Fig. 3k. *T. phaseolina* (9mm) (9666) - L

RT5204 – *Thyasira equalis* (Figure 4a)

Substratum: Sand. Salinity: Full (Euhaline). Depth: Circalittoral (Lower Shelf). Geography: North Sea. Condition: Good, medium (2-4mm).

Fig. 4a. *Thyasira equalis* (RT5204) - L

Three generic and nine specific differences: Labs 02, 11, 14, 18 and 23 identified as *Thyasira sarsii* (Figure 1b); Lab 20 identified as *T. flexuosa* (Figure 1a) (both of which have two posterior sulci and a distinct auricle); Labs 05 and 06 identified as *Axinulus croulinensis* (Figure 4b) (which has a more rounded outline and a single demibranch); Lab 08 identified as *Lucinoma borealis* (Figure 4c) (which has distinct concentric sculpture).

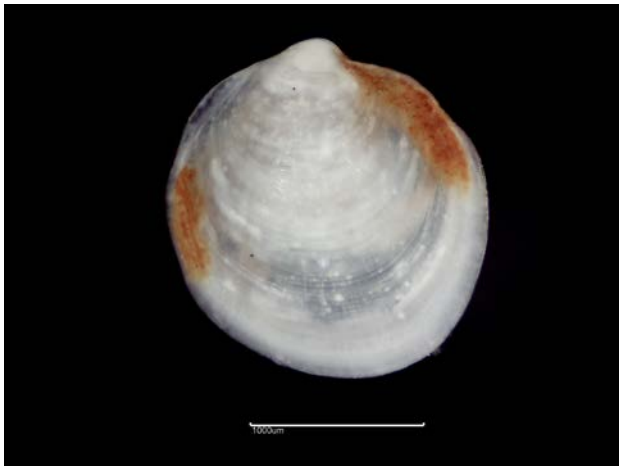

Fig. 4b. *Axinulus croulinensis* (9516) - L

Fig. 4c. *Lucinoma borealis* (9591) - L

RT5205 – *Abra nitida* (Figure 5a)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: Northeast England. Condition: Fair/good, medium (4-6mm).

Fig. 5a. *Abra nitida* (RT5205) – L

One specific difference: Lab 05 identified as *Abra alba* (Figure 5b) (which has a less glossy, less elongate shell with the umbones placed slightly posterior to the midline).

Fig. 5b. Abra alba (4.5mm) (57521) – L

RT5206 – *Fabulina fabula* (Figure 6a)

Substratum: Sand. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: Northeast England. Condition: Fair/good, small (3-5mm).

Fig. 6a. *Fabulina fabula* (RT5206) – L

Fig. 6b. *Macomangulus tenuis* (7334) - L

One generic and one specific difference: Lab 08 identified as *Macomangulus tenuis* (Figure 6b) (which has a less elongate shell, with all ridges completely concentric).

Labs 09 and 11 used the old genus nomenclature: *Tellina*.

RT5207 – *Cerastoderma edule* (Figure 7a)

Substratum: Mud. Salinity: Variable (Euryhaline). Depth: Infralittoral. Geography: Southeast England. Condition: Good, small, juvenile (c. 1mm).

Fig. 7a. *Cerastoderma edule* (RT5207) – L

Six generic and thirteen specific differences: Labs 01, 08, 09, 12, 13, 23 and 24 identified as *Cerastoderma glaucum* (Figure 7b) (which has its ribs more angulated in cross section); Labs 05 and 18 identified as *Parvicardium pinnulatum* (or the mis-spelling *P. pinnulatus*) (Figure 7c); Lab 06 identified as *P. minimum* (Figure 7e) (both of which have more distinct spines on their ribs); Labs 02 and 19 identified as *P. exiguum* (Figure 7d) (which has a more inequilateral shell); Lab 20 identified as *Timoclea ovata* (Figure 7f) (which lacks rib scales at the size sent).

Fig. 7b. *Cerastoderma glaucum* (55873) - L

Fig. 7c. *Parvicardium pinnulatum* (56626) - L

Fig. 7d. *Parvicardium exiguum* (58166) - L

Fig. 7e. *Parvicardium minimum* (10847) - L

Fig. 7f. *Timoclea ovata* (4776) - L

RT5208 – *Tellimya ferruginosa* (Figure 8a)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: Southwest England. Condition: Good, medium (3-4mm).

Fig. 8a. *Tellimya ferruginosa* (RT5208) – L

No generic and no specific differences.

RT5209 – *Nucula nucleus* (Figure 9a)

Substratum: Diamicton. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: Southeast England. Condition: Good, large (8-9mm).

Fig. 9a. *Nucula nucleus* (RT5209) – L

Three specific differences: Labs 08 and 11 identified as *Nucula nitidosa* (Figure 9b) (which has a glossier shell, with a less projecting lunule); Lab 17 identified as *N. hanleyi* (Figure 9c) (which has a more elongate shell, usually with radiating colour bands at this size).

Fig. 9b. *Nucula nitidosa* (56995) – L

Fig. 9c. *Nucula hanleyi* (10453) – L

RT5210 – *Nucula nitidosa* (Figure 10a)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: Northeast England. Condition: Good, small (2-3mm).

Fig. 10a. *Nucula nitidosa* (RT5210) – L

One generic and three specific differences: Lab 08 identified as *Nucula nucleus* (Figure 10b) (which has a less glossy shell); Lab 18 identified as *N. hanleyi* (Figure 10c) (which has a more elongate shell); Lab 14 identified as *Ennucula tenuis* (Figure 10d) (which lacks marginal crenulations and has less distinct valve sculpture).

Fig. 10b. *Nucula nucleus* (11831) – L

Fig. 10c. *Nucula hanleyi* (9804) – L

Fig. 10d. *Ennucula tenuis* (55903) – L

RT5211 – *Asbjornsenia pygmaea* (Figure 11a)

Substratum: Sand. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: Eastern Scotland. Condition: Good, medium (2-3mm).

Fig. 11a. *Asbjornsenia pygmaea* (RT5211) – L

One generic and one specific difference: Lab 20 identified as *Macomangulus tenuis* (Figure 6b) (which has a more angular outline).

Labs 09, 11 and 17 used earlier generic nomenclature: *Tellina* and *Moerella*.

RT5212 – *Abra prismatica* (Figure 12a)

Substratum: Sand. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: Northeast England. Condition: Good, medium (3-5mm).

Fig. 12a. *Abra prismatica* (RT5212) – L

One generic and one specific difference: Lab 08 identified as *Macomangulus tenuis (*Figure 6b) (which has stronger concentric sculpture and a more strongly projecting ligament).

RT5213 – *Chamelea striatula* (Figure 13a)

Substratum: Sand. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: Northeast England. Condition: Good, small, juvenile (3-4mm).

Fig. 13a. *Chamelea striatula* (RT5213) – L

Seven generic and nine specific differences: Labs 06 and 23 identified as *Chamelea gallina* (Figure 13b) (which has concentric ridges with a more rounded cross section and is not a UK species); *C. striatula* has been distinguished from the mainly Mediterranean *C. gallina* (Backeljau et al., 1994); Labs 13, 14 and 18 identified as *Astarte sulcata* (Figure 13c) (which has fewer, much more rounded concentric ridges); Labs 08 and 17 identified as *Venus casina* (Figure 13d) (which has less even ridges for the same sized specimen); Labs 05 and 24 identified as *Clausinella fasciata* (Figure 13e)

(which has more closely spaced ridges at this size).

Fig. 13b. *Chamelea gallina* (Black Sea) – L

Fig. 13c. *Astarte sulcata* (8725) – L

Fig. 13d. *Venus casina* (55077) – L

Fig. 13e. *Clausinella fasciata* (55076) – L

RT5214 – *Montacuta substriata* (Figure 14a)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Circalittoral (Upper shelf). Geography: Southwest England. Condition: Good, medium (1-2mm).

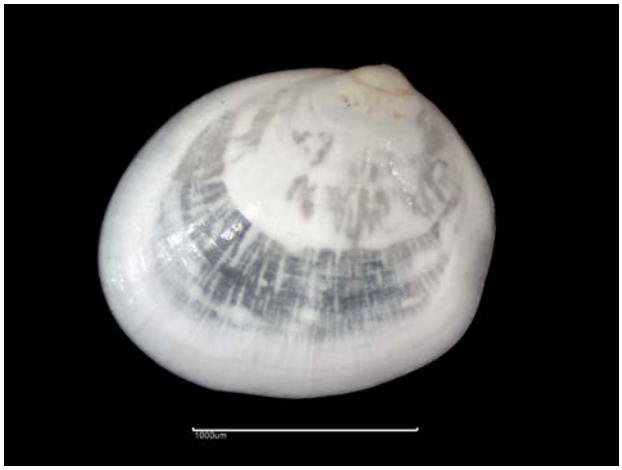

Fig. 14a. *Montacuta substriata* (RT5214) – L

Five generic and five specific differences: Labs 08, 09, 18 and 23 identified as *Epilepton clarkiae* (Figure 14b) (which is more oval and has fine radial grooves, rather than corrugations); Lab 24 identified as *Lasaea adansoni* (Figure 14c) (which has a more tumid, less glossy shell).

Fig. 14b. *Epilepton clarkiae* (58446) – L

Fig. 14c. *Lasaea adansoni* (9588) – L

RT5215 – *Spisula subtruncata* (Figure 15a)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: North of Ireland. Condition: Good, small (c.1mm).

Fig. 15a. *Spisula subtruncata* (RT5215) – L

Four generic and six specific differences: Lab 08 identified as *Spisula elliptica* (Figure 15b) ; Lab 19 identified as *S. solida* (Figure 15c) (both of which have less triangular shells at this size); Labs 11 and 24 identified as *Mactra stultorum* (Figure 15d) (which has a thinner shell with flanges either side of the umbones at this size); Lab 05 identified as *Mendicula ferruginosa* (Figure 15e) (which has a rusty deposit); Lab 14 identified as *Limecola balthica* (Figure 15f) (which has a more rounded outline).

Fig. 15b. *Spisula elliptica* (4800) – L

Fig. 15c. *Spisula solida* (8542) – L

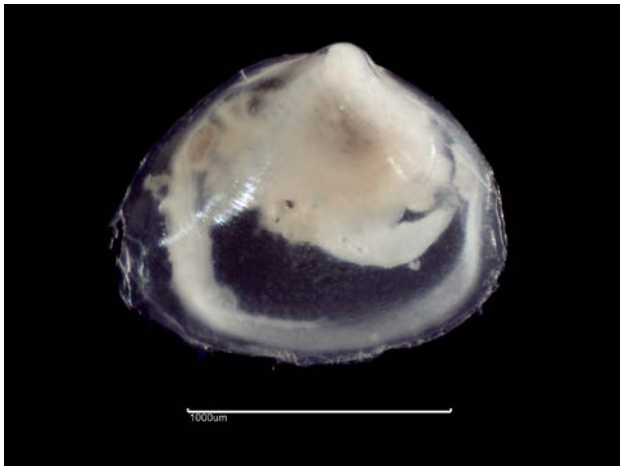

Fig. 15d. *Mactra stultorum* (9729) – L

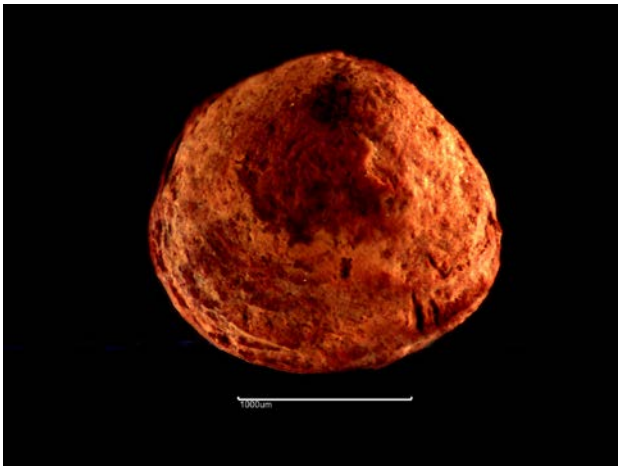

Fig. 15e. *Mendicula ferruginosa* (413691OS) – L

Fig. 15f. *Limecola balthica* (7975) – L

RT5216 – *Adontorhina similis* (Figure 16a)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Circalittoral (Lower Shelf). Geography: North Sea. Condition: Good, medium (1-2mm).

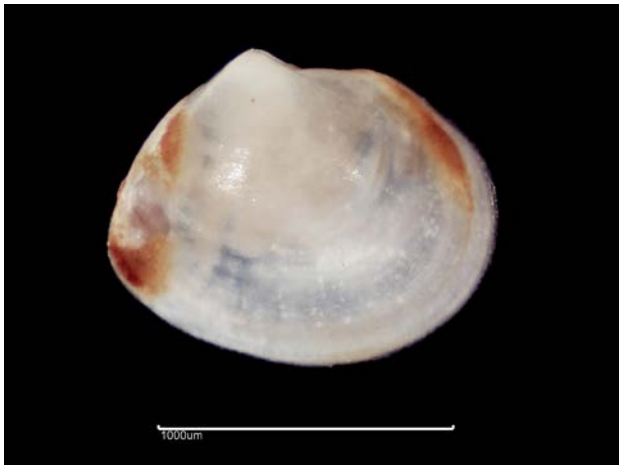

Fig. 16a. *Adontorhina similis* (RT5216) – L

Four generic and four specific differences: Labs 05 and 20 identified as *Mendicula pygmaea* (no material available) (which lacks granules on the hinge margin and is not known from UK waters); previous UK records of *M. pygmaea* are *A. similis* (Barry & McCormack, 2007); Lab 08 identified as *Kellia suborbicularis* (Figure 16b) (which has a more rounded shell and larger prodissoconch – more prominent umbones); Lab 14 identified as *Epilepton clarkiae* (Figure 14b) (which has a more rounded, less tumid shell and radial grooves).

Fig. 16b. *Kellia suborbicularis* (55080) – L

RT5217 – *Goodallia triangularis* (Figure 17a)

Substratum: Gravel. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: Southeast England. Condition: Good, medium (1-2mm).

No generic and no specific differences.

Fig. 17a. *Goodallia triangularis* (RT5217) – L

RT5218 – *Scrobicularia plana* (Figure 18a)

Substratum: Mud. Salinity: Variable (Euryhaline). Depth: Intertidal. Geography: Southwest England. Condition: Good, small, juvenile (ca. 1mm).

Fig. 18a. *Scrobicularia plana* (RT5218) – L

Twenty generic and twenty specific differences: Labs 01, 02, 03, 06, 07, 08, 09, 16, 17, 19 and 20 identified as *Abra tenuis* (which has less distinct umbones – dorsal margins straighter and more continuous with the umbones); Lab 18 identified as *Abra alba* (Figure 18j) (which has umbones more to the posterior of the midline); Labs 05 and 14 identified as *Hemilepton nitidum* (Figure 18k); Labs 11 and 13 identified as *Kurtiella bidentata* (Figure 18l) (both of which have a more oblong shell); Lab 15 identified as *Mya arenaria* (Figure 18m) (which has an inequilateral shell); Lab 24 identified as *Limecola balthica* (Figure 15f) (which has a more inequilateral shell); Lab 23 identified as *Spisula* juv. (Figures 15a-15c) (which have glossier shells with the umbones

more twisted to one end), Lab 10 identified as *Abra* sp. (identification to species is required for ring test results, with the 'confidence level' used to qualify the submission).

Figures 18b-18i show growth series of *S. plana* and *A. tenuis* for comparison.

Fig. 18b. *S. plana* (1.5mm) (9000) – L

Fig. 18c. *A. tenuis* (1.5mm) (56013) – L

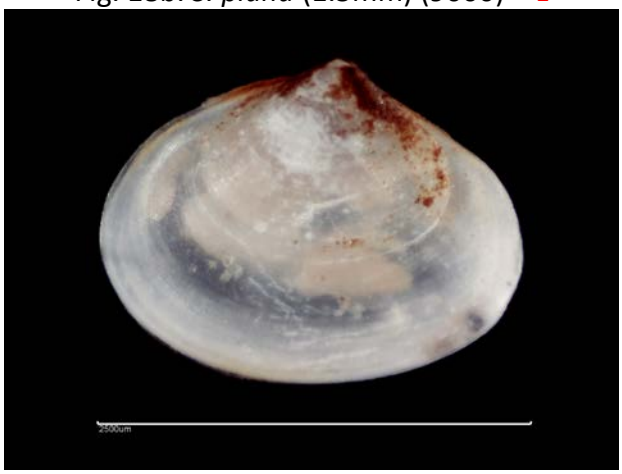

Fig. 18d. *S. plana* (2.5mm) (8864) – L

Fig. 18e. *A. tenuis* (2.5mm) (7958) – L

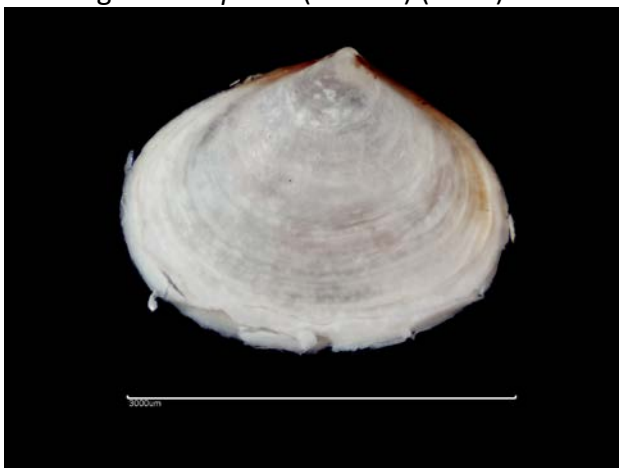

Fig. 18f. *S. plana* (3mm) (8546) – L

Fig. 18g. *A. tenuis* (3mm) (7958) – L

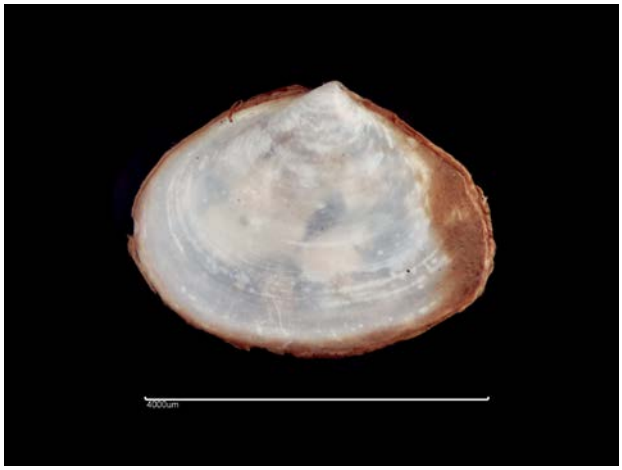

Fig. 18h. *S. plana* (4mm) (8864) – L

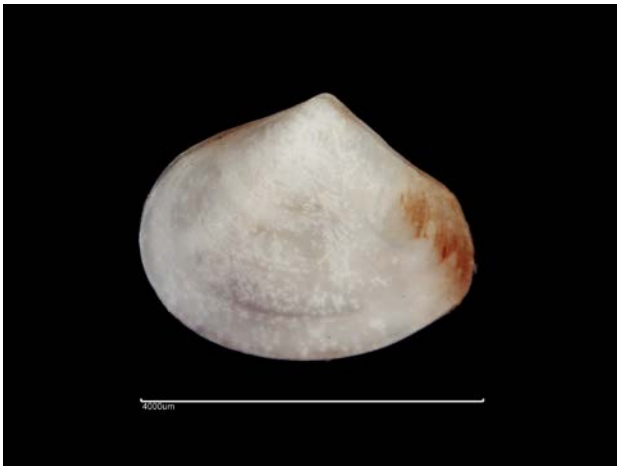

Fig. 18i. *A. tenuis* (4mm) (7958) – L

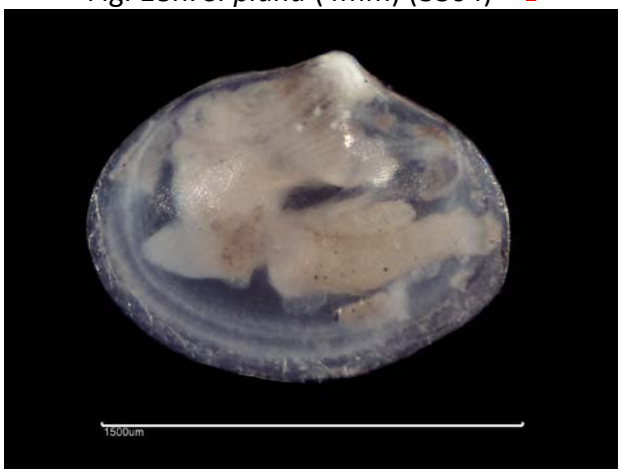

Fig. 18j. *Abra alba* (1.5mm) (57521) – L

Fig. 18k. *Hemilepton nitidum* (5945) – L

Fig. 18l. *Kurtiella bidentata* (12362) – L

Fig. 18m. *Mya arenaria* (RT49_17) – L

RT5219 – *Cerastoderma edule* (Figure 19a)

Substratum: Mud. Salinity: Variable (Euryhaline). Depth: Infralittoral. Geography: Southeast England. Condition: Good, small, juvenile (2-3mm).

Fig. 19a. *Cerastoderma edule* (RT5219) – L

Nine generic and thirteen specific differences: Labs 01, 08, 19 and 24 identified as *Cerastoderma glaucum* (Figure 7b) (which has its ribs more angulated in cross section); Labs 11, 13, 20 and 23 identified as *Parvicardium pinnulatum* (or the synonym *P. ovale*) (Figure 19b); Lab 06 identified as *P. minimum* (Figure 19c); Lab 02 identified as *P. scabrum* (Figure 19d) (all of which have more distinct spines on their ribs); Lab 14 identified as *P. exiguum* (Figure 7d) (which has a more inequilateral shell); Labs 05 and 18 identified as *Acanthocardia echinata* (Figure 19e) (which has fewer ribs).

Fig. 19b. *Parvicardium pinnulatum* (56626) – L

Fig. 19c. *Parvicardium minimum* (10847) – L

Fig. 19d. *Parvicardium scabrum* (55855) – L

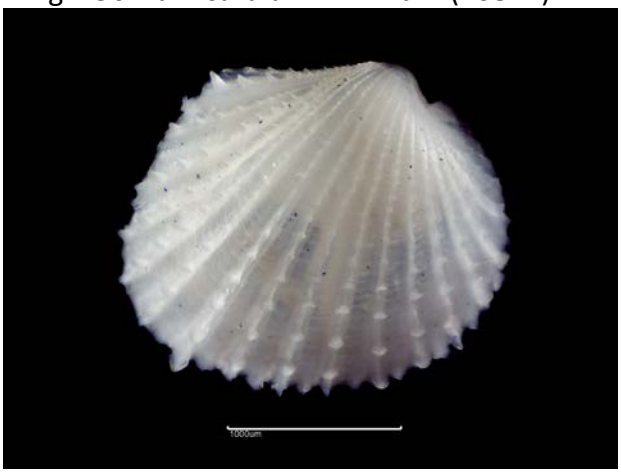

Fig. 19e. *Acanthocardia echinata* (10839) – L

RT5220 – *Arctica islandica* (Figure 20a)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Circalittoral (Lower Shelf). Geography: North Sea. Condition: Good, small, juvenile (c.1mm).

Four generic and four specific differences: Labs 05, 14 and 19 identified as *Kellia suborbicularis* (Figure 16b) (which has a larger prodissoconch); Lab 18 identified as *Gouldia minima* (Figure 20b) (which has a more solid, less tumid shell).

Fig. 20a. *Arctica islandica* (RT5220) – L

Fig. 20b. *Gouldia minima* (5912) - L

RT5221 – *Kurtiella bidentata* (Figure 21a)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Circalittoral (Upper shelf). Geography: Southwest England. Condition: Good, medium (2-3mm).

Two generic and two specific differences: Labs 05 and 06 identified as *Tellimya ferruginosa* (Figure 8a) (which has a more elongated shell).

Fig. 21a. *Kurtiella bidentata* (RT5221) – L

RT5222 – *Venerupis corrugata* (Figure 22a)

Substratum: Diamicton. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: Southeast England. Condition: Good, small, juvenile (2-3mm).

Fig. 22a. *Venerupis corrugata* (RT5222) – L

Nine generic and nine specific differences: Labs 07, 11, 12 and 24 identified as *Polititapes rhomboides* or the synomym *Tapes rhomboides* (Figure 22b) (which has a more rounded, less elongated shell at this size); Labs 05, 09 and 23 identified as *Kurtiella bidentata* (Figure 22c); Labs 14 and 18 identified as *Tellimya ferruginosa* (Figure 8a) (both of which have umbones that are less twisted towards one end).

Labs 03, 06 and 20 recorded synonyms: *Tapes corrugata*, *Polititapes corrugata* and *Venerupis senegalensis*. We could find no record of the species having been placed in *Polititapes*.

Fig. 22b. *Polititapes rhomboides* (9784) – L

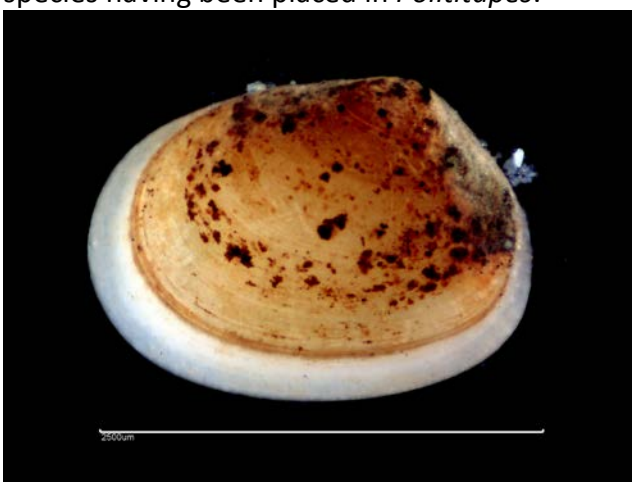

Fig. 22c. *Kurtiella bidentata* (12363) – L

RT5223 – *Barnea parva* (Figure 23a)

Substratum: Hard substrata. Salinity: Full (Euhaline). Depth: Intertidal. Geography: Southwest England. Condition: Good, medium (10-20mm).

Fig. 23a. *Barnea parva* (RT5223) – L

No generic and no specific differences.

RT5224 – *Abra alba* (Figure 24a)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: Southwest England. Condition: Fair/good, small (4-5mm).

Fig. 24a. *Abra alba* (RT5224) – L

One generic and two specific differences; Lab 18 identified as *Abra prismatica* (Figure 12a) (which has a more elongated shell with umbones further to the posterior); Lab 10 identified as *Scrobicularia plana* (Figure 18h shows a specimen of this size) (which has umbones at the mid line).

RT5225 – *Nucula nucleus* (Figure 25a)

Substratum: Diamicton. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: North of Ireland. Condition: Good, small (c.2mm).

Fig. 25a. *Nucula nucleus* (RT5225) – L

No generic and eleven specific differences: Labs 02, 06, 07, 14, 18 and 24 identified as *Nucula nitidosa* (Figures 25b) (which has a glossier shell); Lab 05 identified as *N. hanleyi* (Figure 10c) (which has a more elongate shell); Lab 10 identified as *Nucula sulcata* (Figure 25c) (which has a more tumid shell at this size).

Fig. 25b. *Nucula nitidosa* (59491) – L

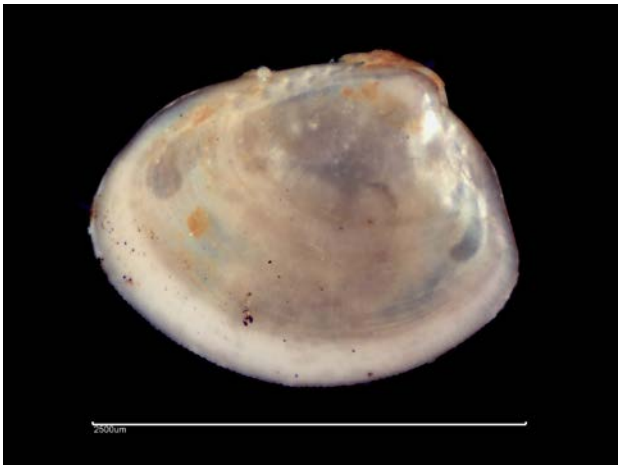

Fig. 25d. *Nucula sulcata* (55952) – L

Acknowledgements

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References

Backeljau, T., Bouchet, P., Gofas, S. & Bruyn, L. de, 1994. Genetic variation, systematics and distribution of the venerid clam *Chamelea gallina*. *Journal of the Marine Biological Association of the United Kingdom*, 74, 211-223.

Barry, P.J. & McCormack, G., 2007. Two new species of *Adontorhina* Berry, 1947 (Bivalvia: Thyasiridae) from the Porcupine Bank, off the west coast of Ireland. *Zootaxa*, 1526, 37-49.

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Ring Test Specimen Return Instructions

Please return all ring test specimens by 31st March 2017. These are reference collection specimens and must be returned to our museum. Your laboratory will be ineligible for future ring tests if specimens are not returned.

Return address: **David Hall, APEM Ltd., 7a Diamond Centre,**
Works Road, Letchworth, Hertfordshire SG6 1LW, UK