NMBAQC

NE Atlantic Marine Biological Analytical Quality Control Scheme

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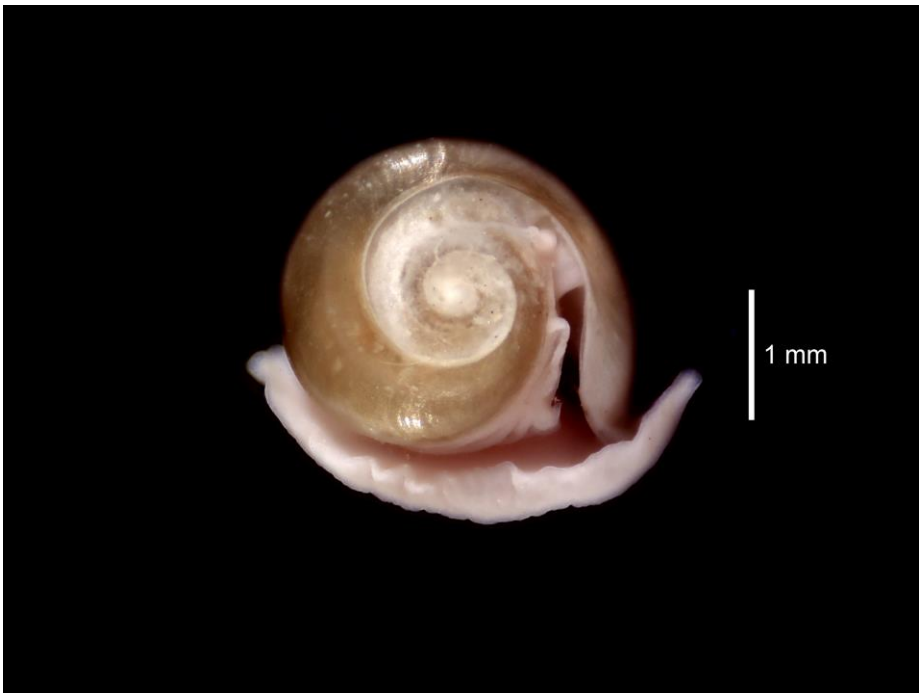
Ring Test Bulletin – RTB#62



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RING TEST DETAILS

Ring Test #62 (Year 28)

Type/Contents – Targeted, Gastropoda

Circulated – 19/11/21

Results deadline – 14/01/22

Number of Subscribing Laboratories – 22

Number of Participating Laboratories – 19

Number of Results Received – 21*

***multiple data entries per laboratory permitted**

Summary of differences

Specimen	Genus	Species	Condition / Size	Total differences for 21 returns	
				Genus	Species
RT6201	*Caecum*	*glabrum*	Good; Medium, 1-2mm	0	0
RT6202	*Retusa*	*truncatula*	Good; Medium, 1-2mm	0	0
RT6203	*Eulima*	*glabra*	Good; Medium, 6-10mm	0	0
RT6204	*Peringia*	*ulvae*	Good; Medium, 2-3mm	1	1
RT6205	*Hyala*	*vitrea*	Good; Medium, 2-4mm	0	0
RT6206	*Rissoa*	*parva*	Good; Medium, 3-4mm	4	4
RT6207	*Onoba*	*aculeus*	Good; Medium, 1.5-2.5mm	0	2
RT6208	*Potamopyrgus*	*antipodarum*	Good; Medium, 3-5mm	1	1
RT6209	*Philine*	*denticulata*	Fair; Small, 0.5-1mm	10	15
RT6210	*Brachystomia*	*eulimoides*	Good; Medium, 1-2mm	3	5
RT6211	*Retusa*	*obtusa*	Good; Medium, 1-2mm	0	0
RT6212	*Ecrobia*	*ventrosa*	Good; Medium, 3-5mm	4	4
RT6213	*Retusa*	*umbilicata*	Good; Medium, 1-2mm	3	4
RT6214	*Steromphala*	*umbilicalis*	Good; Medium, 14-16mm	0	3
RT6215	*Eulimella*	*acicula*	Fair; Medium, 2-3mm	4	8
RT6216	*Margarites*	*helicinus*	Good; Small, 1-1.5mm	15	15
RT6217	*Obtusella*	*intersecta*	Fair; Small, 0.5-1mm	7	7
RT6218	*Lacuna*	*vincta*	Good; Small, 2-2.5mm	1	2
RT6219	*Onoba*	*semicostata*	Good; Medium, 2-3mm	0	0
RT6220	*Heleobia*	*charruana*	Good; Medium, 3-4mm	12	12
RT6221	*Philine*	*quadripartita*	Fair; Small, 3-5mm	2	10
RT6222	*Ebala*	*nitidissima*	Good; Medium, 2-3mm	5	5
RT6223	*Assiminea*	*grayana*	Fair; Medium, 2-3mm	1	1
RT6224	*Akera*	*bullata*	Fair; Medium, 4-8mm	7	7
RT6225	*Lacuna*	*pallidula*	Good; Small, 0.5-1.5mm	8	9
			Total differences	88	115
			Average differences /lab.	4.2	5.5

Figure 1. The number of differences from the AQC identification of specimens distributed in RT62 for each of the participating laboratories. Arranged in order of increasing number of differences (by specific followed by generic errors).

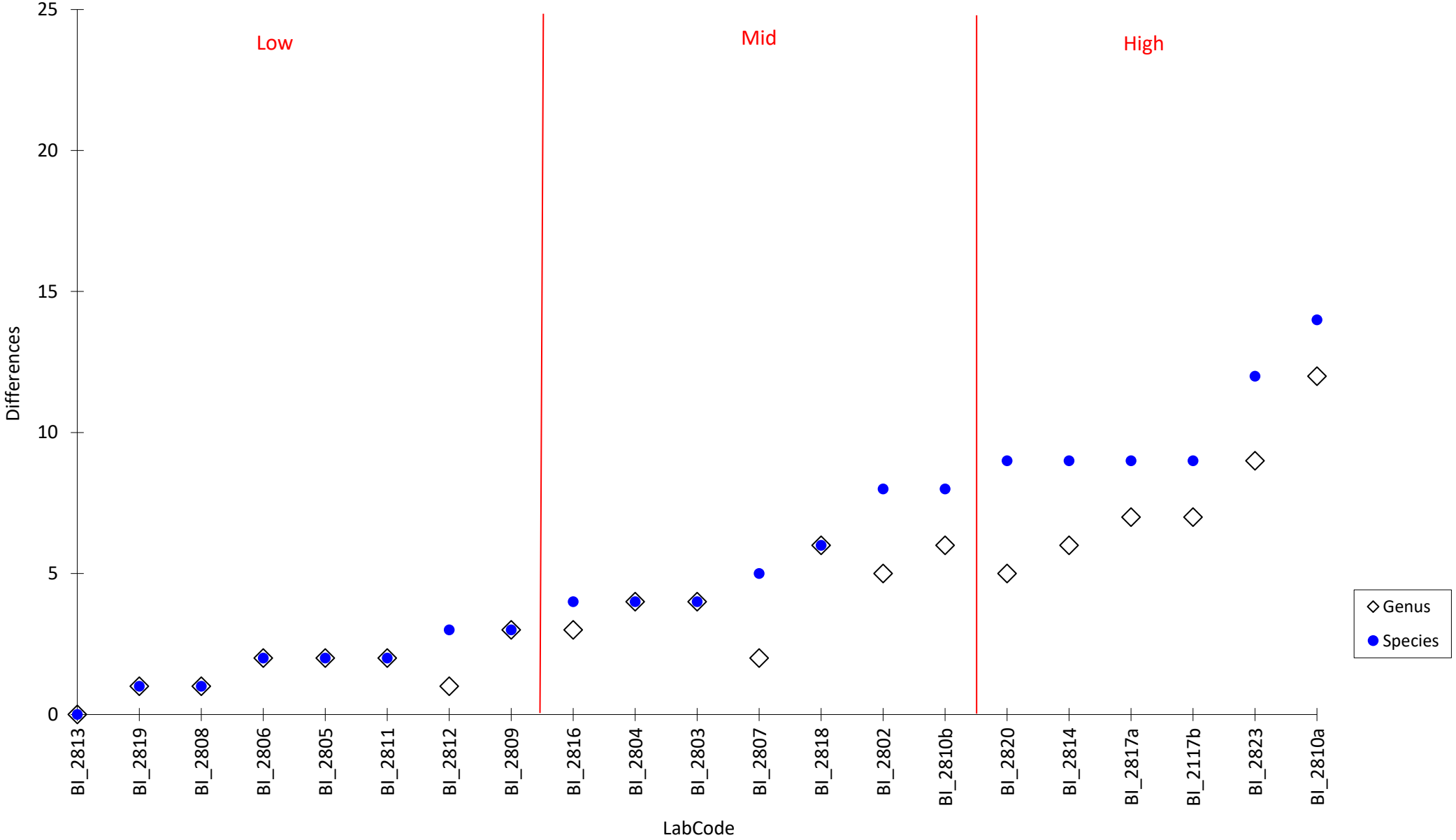

Table 1. The identification of fauna made by participating laboratories for RT62 (arranged by specimen). Names are given only where different from the AQC identification.

	RT6201	RT6202	RT6203	RT6204	RT6205	RT6206	RT6207	RT6208	RT6209	RT6210	RT6211	RT6212
Taxon	*Caecum glabrum*	*Retusa truncatula*	*Eulima glabra*	*Peringia ulvae*	*Hyala vitrea*	*Rissoa parva*	*Onoba aculeus*	*Potamopyrgus antipodarum*	*Philine denticulata*	*Brachystomia eulimoides*	*Retusa obtusa*	*Ecrobia ventrosa*
BI_2802	- -	- -	- -	- -	- -	- -	- -	- [jenkinsi]	Roxania utriculus	- lukisi	- -	[Hydrobia] -
BI_2803	- -	- -	- -	- -	- -	- -	- -	- -	Cylichna alba	- -	- -	- -
BI_2804	- -	- -	- -	- -	- -	- -	- -	- -	Diaphana minuta	[Brachyostomia] -	- -	Hydrobia acuta neglecta
BI_2805	- -	- -	- -	- -	- -	- -	- -	- -	Retusa obtusa	- -	- -	- -
BI_2806	- -	- -	- -	- -	- -	- -	- -	- -	Diaphana minuta	- -	- -	- -
BI_2807	- -	- -	- -	- -	- -	- [parva var. interrupta]	- -	- -	- -	- -	- -	- -
BI_2808	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_2809	- -	- -	- -	- -	- -	- -	- -	- -	[Philene] -	- -	- -	- -
BI_2810a	- -	- -	- -	[Hydrobia] -	- -	Alvania semistriata	- -	[Potamopyrgos] -	Philinidae 0	Odostomia turrita	- -	Potamopyrgos antipodarum?
BI_2810b	- -	- -	- -	[Hydrobia] -	- -	- [parva / interrupta]	- -	- [jenkinsi]	Scaphander lignarius	Ondina diaphana	- -	- -
BI_2811	- -	- -	- -	- -	- -	- -	- -	- -	- -	Ondina diaphana	- -	- -
BI_2812	- -	- -	- -	- -	- -	- -	- -	- -	- punctata	- -	- -	- -
BI_2813	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_2814	- -	- -	- -	Hydrobia acuta neglecta	- -	- -	- semicostata	Heleobia charruana	- quadripartita	- -	- -	- -
BI_2816	- -	- -	- -	- -	- -	- -	- -	- -	- quadripartita	- -	- -	- -
BI_2817a	- -	- -	- -	- -	- -	Cingula trifasciata	- -	- -	- sp.	- -	- -	Hydrobia acuta neglecta
BI_2117b	- -	- -	- -	- -	- -	Cingula trifasciata	- -	- -	- sp.	- -	- -	Hydrobia acuta neglecta
BI_2818	- -	- -	- -	- -	- -	- -	- -	- -	Diaphana minuta	- -	- -	- -
BI_2819	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_2820	- -	- -	- -	- -	- -	- -	- semicostata	- -	0 0	- scalaris	- -	- -
BI_2823	- -	- -	- -	- -	- -	Barleeia unifasciata	- -	- -	Diaphana minuta	- -	- -	- -

Table 1. The identification of fauna made by participating laboratories for RT62 (arranged by specimen). Names are given only where different from the AQC identification.

	RT6213	RT6214	RT6215	RT6216	RT6217	RT6218	RT6219	RT6220	RT6221	RT6222	RT6223	RT6224	RT6225
Taxon	*Retusa umbilicata*	*Steromphala umbilicalis*	*Eulimella acicula*	*Margarites helicinus*	*Obtusella intersecta*	*Lacuna vincta*	*Onoba semicostata*	*Heleobia charruana*	*Philine quadripartita*	*Ebala nitidissima*	*Assiminea grayana*	*Akera bullata*	*Lacuna pallidula*
BI_2802	- -	[Gibbula] -	- ventricosa	- -	Rissoella opalina	- -	- -	Hydrobia neglecta	- aperta	- -	- -	Haminoea navicula	Littorina mariae
BI_2803	- -	- -	- -	Skenea serpuloides	- -	- -	- -	Peringia ulvae	- -	- -	- -	Roxania utriculus	- -
BI_2804	- -	- [umbilicaris]	- -	- -	- -	- -	- -	Bithynia tentaculata	- -	Eulimella ventricosa	- -	- -	- -
BI_2805	- -	- -	- -	Skenea serpuloides	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_2806	- -	- -	- -	Skenea serpuloides	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_2807	- -	- cineraria	- scillae	- -	- -	- -	- -	Peringia ulvae	- aperta	- -	- -	- -	Velutina velutina
BI_2808	- -	- -	- -	Skenea serpuloides	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_2809	- -	- -	Turbonilla lactea	Skenea serpuloides	- -	- -	- -	- -	- [quadripartitia]	Graphis albida	- -	- -	- -
BI_2810a	Cylichna alba	[Gibbula] cineraria	Jordaniella truncatula	Tornus univulcatus?	Paludinella littorina	Cingulopsis fulgida	- -	Hydrobia ulvae	- sp?	[Ebalia] -	[Assinea] -	Diaphana minuta	Velutina velutina
BI_2810b	- -	[Gibbula] pennanti	- [laevis]	Skenea serpuloides	Rissoella opalina	- -	- -	Hydrobia ulvae	- aperta	- -	- -	- -	Littorina obtusata
BI_2811	- -	- -	- -	Skenea serpuloides	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_2812	- -	- -	- scillae	- -	- -	- -	- -	- -	- -	- -	- -	Diaphana minuta	- -
BI_2813	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_2814	- -	[Gibbula] -	- compactilis	Dikoleps nitens	- -	- -	- -	- -	Hermania scabra	Eulimella ventricosa	- -	Retusa obtusa	- -
BI_2816	- -	- [umbilicaris]	- -	Skenea serpuloides	Rissoella opalina	- -	- -	Bithynia tentaculata	- -	- -	- -	- -	- -
BI_2817a	Cylichna alba	- -	- -	Skeneopsis planorbis	Rissoella diaphana	- -	- -	Rissoa sp.	- aperta	- -	- -	- -	Velutina velutina
BI_2117b	Cylichna alba	- -	- -	Skeneopsis planorbis	Rissoella diaphana	- -	- -	Pussilina inconspicua	- aperta	- -	- -	- -	Margarites helicinus
BI_2818	- -	- -	Odostomia plicata	Skenea serpuloides	- -	- -	- -	- -	Laona quadrata	Eulimella ventricosa	- -	- -	Margarites helicinus
BI_2819	- -	- -	- -	- -	- -	- -	- -	Peringia ulvae	- -	- -	- -	- -	- -
BI_2820	- -	- -	- -	Skeneopsis planorbis	Rissoella diaphana	- -	- -	Peringia ulvae	- aperta	- -	- -	Retusa obtusa	- parva
BI_2823	- truncatula	- -	Odostomia unidentata	Skenea serpuloides	- -	- parva	- -	Peringia ulvae	- aperta	Eulimella ventricosa	Peringia ulvae	Hermania scabra	Littorina obtusa

Table 2. The identification of fauna made by participating laboratories for RT62 (arranged by participant). Names are given only where different from the AQC identification.

	Taxon	BI_2802	BI_2803	BI_2804	BI_2805	BI_2806	BI_2807	BI_2808	BI_2809	BI_2810a	BI_2810b	BI_2811	BI_2812	BI_2813
RT6201	*Caecum glabrum*	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
RT6202	*Retusa truncatula*	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
RT6203	*Eulima glabra*	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
RT6204	*Peringia ulvae*	- -	- -	- -	- -	- -	- -	- -	- -	[Hydrobia] -	[Hydrobia] -	- -	- -	- -
RT6205	*Hyala vitrea*	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
RT6206	*Rissoa parva*	- -	- -	- -	- -	- -	- [parva var. interrupta]	- -	- -	Alvania semistriata	- [parva / interrupta]	- -	- -	- -
RT6207	*Onoba aculeus*	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
RT6208	*Potamopyrgus antipodarum*	- [jenkinsi]	- -	- -	- -	- -	- -	- -	- -	[Potamopyrgos] -	- [jenkinsi]	- -	- -	- -
RT6209	*Philine denticulata*	Roxania utriculus	Cylichna alba	Diaphana minuta	Retusa obtusa	Diaphana minuta	- -	- -	[Philene] -	Philinidae 0	Scaphander lignarius	- -	- punctata	- -
RT6210	*Brachystomia eulimoides*	- lukisi	- -	[Brachyostomia] -	- -	- -	- -	- -	- -	Odostomia turrita	Ondina diaphana	Ondina diaphana	- -	- -
RT6211	*Retusa obtusa*	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
RT6212	*Ecrobia ventrosa*	[Hydrobia] -	- -	Hydrobia acuta neglecta	- -	- -	- -	- -	- -	Potamopyrgos antipodarum?	- -	- -	- -	- -
RT6213	*Retusa umbilicata*	- -	- -	- -	- -	- -	- -	- -	- -	Cylichna alba	- -	- -	- -	- -
RT6214	*Steromphala umbilicalis*	[Gibbula] -	- -	- [umbilicaris]	- -	- -	- cineraria	- -	- -	[Gibbula] cineraria	[Gibbula] pennanti	- -	- -	- -
RT6215	*Eulimella acicula*	- ventricosa	- -	- -	- -	- -	- scillae	- -	Turbonilla lactea	Jordaniella truncatula	- [laevis]	- -	- scillae	- -
RT6216	*Margarites helicinus*	- -	Skenea serpuloides	- -	Skenea serpuloides	Skenea serpuloides	- -	Skenea serpuloides	Skenea serpuloides	Tornus univulcatus?	Skenea serpuloides	Skenea serpuloides	- -	- -
RT6217	*Obtusella intersecta*	Rissoella opalina	- -	- -	- -	- -	- -	- -	- -	Paludinella littorina	Rissoella opalina	- -	- -	- -
RT6218	*Lacuna vincta*	- -	- -	- -	- -	- -	- -	- -	- -	Cingulopsis fulgida	- -	- -	- -	- -
RT6219	*Onoba semicostata*	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
RT6220	*Heleobia charruana*	Hydrobia neglecta	Peringia ulvae	Bithynia tentaculata	- -	- -	Peringia ulvae	- -	- -	Hydrobia ulvae	Hydrobia ulvae	- -	- -	- -
RT6221	*Philine quadripartita*	- aperta	- -	- -	- -	- -	- aperta	- -	- [quadripartitia]	- sp?	- aperta	- -	- -	- -
RT6222	*Ebala nitidissima*	- -	- -	Eulimella ventricosa	- -	- -	- -	- -	Graphis albida	[Ebalia] -	- -	- -	- -	- -
RT6223	*Assiminea grayana*	- -	- -	- -	- -	- -	- -	- -	- -	[Assinea] -	- -	- -	- -	- -
RT6224	*Akera bullata*	Haminoea navicula	Roxania utriculus	- -	- -	- -	- -	- -	- -	Diaphana minuta	- -	- -	Diaphana minuta	- -
RT6225	*Lacuna pallidula*	Littorina mariae	- -	- -	- -	- -	Velutina velutina	- -	- -	Velutina velutina	Littorina obtusata	- -	- -	- -

Table 2. The identification of fauna made by participating laboratories for RT62 (arranged by participant). Names are given only where different from the AQC identification.

	Taxon	BI_2814	BI_2816	BI_2817a	BI_2117b	BI_2818	BI_2819	BI_2820	BI_2823
RT6201	*Caecum glabrum*	- -	- -	- -	- -	- -	- -	- -	- -
RT6202	*Retusa truncatula*	- -	- -	- -	- -	- -	- -	- -	- -
RT6203	*Eulima glabra*	- -	- -	- -	- -	- -	- -	- -	- -
RT6204	*Peringia ulvae*	Hydrobia acuta neglecta	- -	- -	- -	- -	- -	- -	- -
RT6205	*Hyala vitrea*	- -	- -	- -	- -	- -	- -	- -	- -
RT6206	*Rissoa parva*	- -	- -	Cingula trifasciata	Cingula trifasciata	- -	- -	- -	Barleeia unifasciata
RT6207	*Onoba aculeus*	- semicostata	- -	- -	- -	- -	- -	- semicostata	- -
RT6208	*Potamopyrgus antipodarum*	Heleobia charruana	- -	- -	- -	- -	- -	- -	- -
RT6209	*Philine denticulata*	- quadripartita	- quadripartita	- sp.	- sp.	Diaphana minuta	- -	0 0	Diaphana minuta
RT6210	*Brachystomia eulimoides*	- -	- -	- -	- -	- -	- -	- scalaris	- -
RT6211	*Retusa obtusa*	- -	- -	- -	- -	- -	- -	- -	- -
RT6212	*Ecrobia ventrosa*	- -	- -	Hydrobia acuta neglecta	Hydrobia acuta neglecta	- -	- -	- -	- -
RT6213	*Retusa umbilicata*	- -	- -	Cylichna alba	Cylichna alba	- -	- -	- -	- truncatula
RT6214	*Steromphala umbilicalis*	[Gibbula] -	- [umbilicaris]	- -	- -	- -	- -	- -	- -
RT6215	*Eulimella acicula*	- compactilis	- -	- -	- -	Odostomia plicata	- -	- -	Odostomia unidentata
RT6216	*Margarites helicinus*	Dikoleps nitens	Skenea serpuloides	Skeneopsis planorbis	Skeneopsis planorbis	Skenea serpuloides	- -	Skeneopsis planorbis	Skenea serpuloides
RT6217	*Obtusella intersecta*	- -	Rissoella opalina	Rissoella diaphana	Rissoella diaphana	- -	- -	Rissoella diaphana	- -
RT6218	*Lacuna vincta*	- -	- -	- -	- -	- -	- -	- -	- parva
RT6219	*Onoba semicostata*	- -	- -	- -	- -	- -	- -	- -	- -
RT6220	*Heleobia charruana*	- -	Bithynia tentaculata	Rissoa sp.	Pussilina inconspicua	- -	Peringia ulvae	Peringia ulvae	Peringia ulvae
RT6221	*Philine quadripartita*	Hermania scabra	- -	- aperta	- aperta	Laona quadrata	- -	- aperta	- aperta
RT6222	*Ebala nitidissima*	Eulimella ventricosa	- -	- -	- -	Eulimella ventricosa	- -	- -	Eulimella ventricosa
RT6223	*Assiminea grayana*	- -	- -	- -	- -	- -	- -	- -	Peringia ulvae
RT6224	*Akera bullata*	Retusa obtusa	- -	- -	- -	- -	- -	Retusa obtusa	Hermania scabra
RT6225	*Lacuna pallidula*	- -	- -	Velutina velutina	Margarites helicinus	Margarites helicinus	- -	- parva	Littorina obtusa

Specimen Images and Detailed Breakdown of Identifications

RT62 was targeted on Gastropoda. The Ring Test included nine species never previously sent. There were also several species anticipated to change our understanding of the fauna. These included insights to help with the development of a taxonomic discrimination protocol, as detailed under family headings in the discussion section below.

LabCodes are abbreviated in this report to exclude the Scheme year, *e.g.* BI_2801 = 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; Ape=apertural; P=posterior; L=lateral; D=dorsal (apical in gastropods); V=ventral (basal in gastropods). The codes in brackets following the species names below the figures are sample identification codes to allow tracking of sources of specimens.

RT6201 – *Caecum glabrum* (Montagu, 1803) (Figure 1a)

Substratum: Sand. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: southeast England. Condition: Good. Size: Medium, 1-2mm. Specimens from four samples.

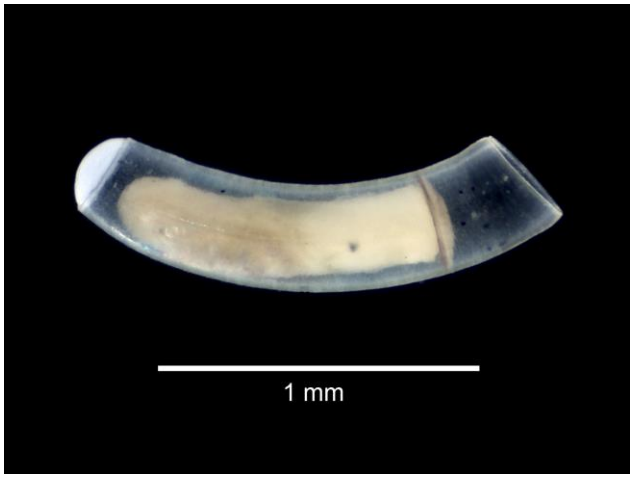

Fig. 1a. *Caecum glabrum* (RT6201; 10172) – L

No generic or specific differences recorded.

RT6202 – *Retusa truncatula* (Bruguière, 1792) (Figure 2a)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: north of Ireland. Condition: Good. Size: Medium, 1-2mm. Specimens from four samples.

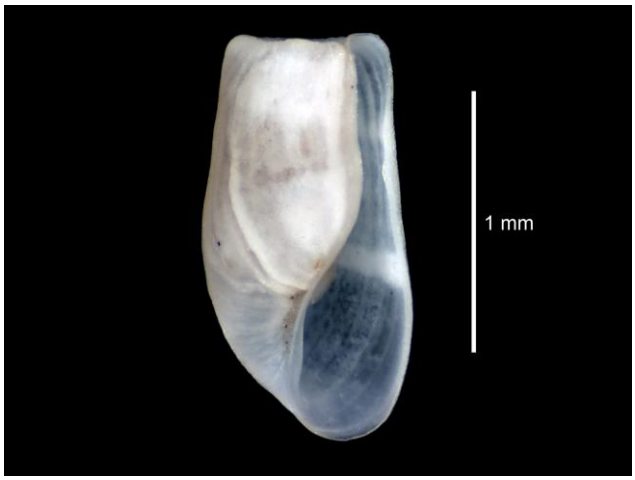

Fig. 2a. *Retusa truncatula* (RT6202; 58704) – Ape

No generic or specific differences recorded.

RT6203 – *Eulima glabra* (da Costa, 1778) (Figure 3a)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: southwest England. Condition: Good. Size: Medium, 6-10mm. Specimens from two samples.

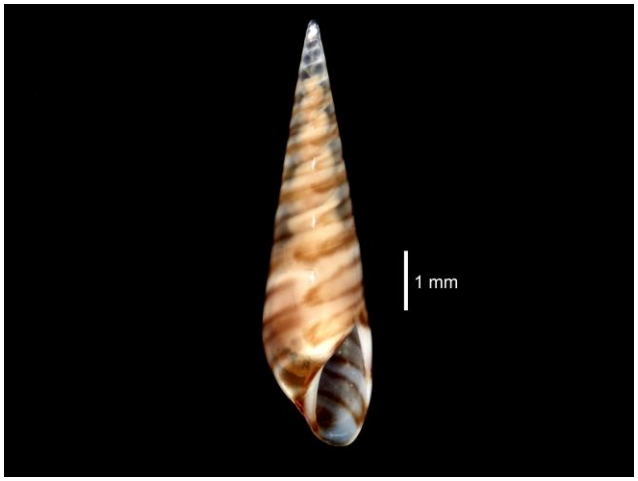

Fig. 3a. *Eulima glabra* (RT6203; CEFAS) – Ape

No generic or specific differences recorded.

RT6204 – *Peringia ulvae* (Pennant, 1777) (Figure 4a)

Substratum: Mud. Salinity: Variable (Euryhaline). Depth: Intertidal. Geography: Wales. Condition: Good. Size: Medium, 2-3mm. All specimens from one sample.

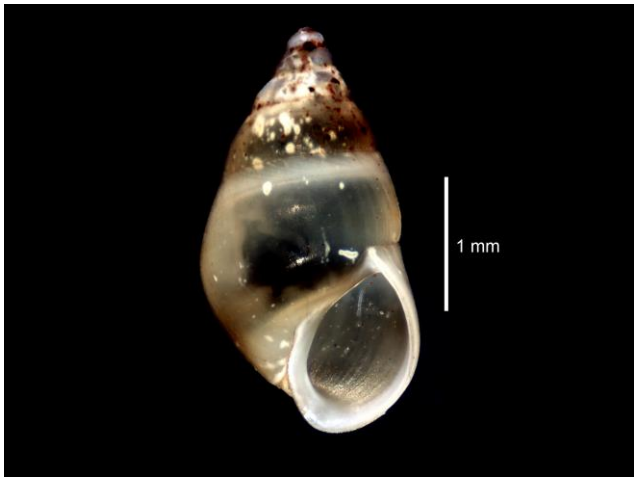

Fig. 4a. *Peringia ulvae* (RT6204; 57206) – Ape

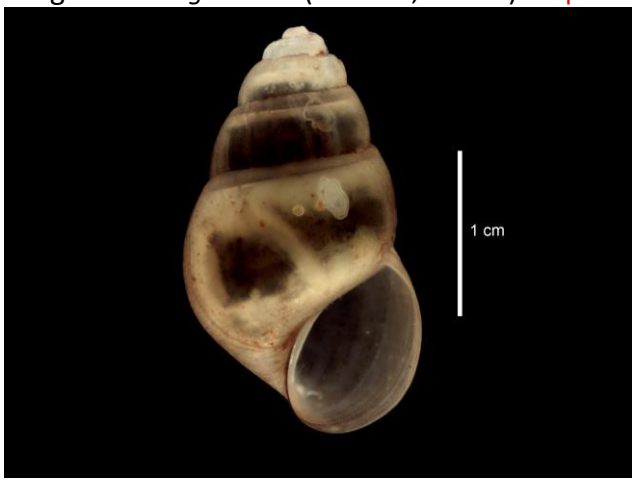

Fig. 4b. *Hydrobia acuta neglecta* (P842, 13A) – Ape

One generic and specific difference: Lab 14 identified as *Hydrobia acuta neglecta* (Figure 04b) (which has more tumid whorls).

Labs 10a and 10b used the synonym *Hydrobia ulvae*.

RT6205 – *Hyala vitrea* (Montagu, 1803) (Figure 5a)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: western Scotland. Condition: Good. Size: Medium, 2-4mm. Specimens from four samples.

Fig. 5a. *Hyala vitrea* (RT6205; 58613) – Ape

No generic or specific differences recorded.

RT6206 – *Rissoa parva* (da Costa, 1778) (Figure 6a)

Substratum: Diamicton. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: southeast England. Condition: Good. Size: Medium, 3-4mm. All specimens from one sample.

Fig. 6a. *Rissoa parva* (RT6206; 11347) – Ape

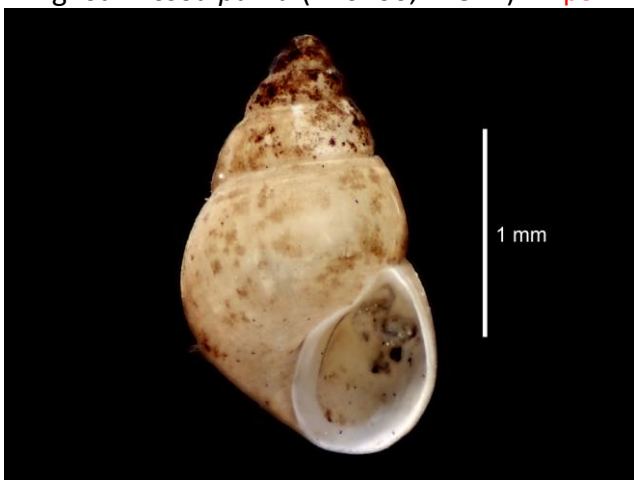

Fig. 6b. *Crisilla semistriata* (P847, 58072) – Ape

Four generic and specific differences: Lab 10a identified as *Alvania semistriata*, a synonym of *Crisilla semistriata* (Figure 06b) (which has faint spiral sculpture). Labs 17a and 17b identified as *Cingula trifasciata* (Figure 06c) (which has spiral sculpture and colour bands and lacks a thickened outer lip). Lab 23 identified as *Barleeia unifasciata* (Figure 06d) (which has a red operculum and lacks a thickened outer lip).

Fig. 6c. *Cingula trifasciata* (P4652, 1) – Ape

Fig. 6d. *Barleeia unifasciata* (411251, 35510) – Ape

RT6207 – *Onoba aculeus* (Gould, 1841) (Figure 7a)

Substratum: Diamicton. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: north of Ireland. Condition: Good. Size: Medium, 1.5-2.5mm. All specimens from one sample.

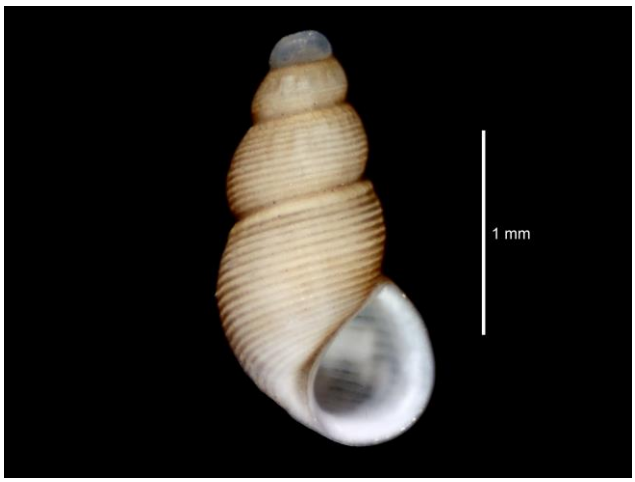

Fig. 7a. *Onoba aculeus* (RT6207; 58719) – Ape

Two specific differences: Labs 14 and 20 identified as *Onoba semicostata* (Figure 19a) (which has a smaller protoconch).

RT6208 – *Potamopyrgus antipodarum* (Gray, 1843) (Figure 8a)

Substratum: Floral turf. Salinity: Low (Oligohaline). Depth: Infralittoral. Geography: southeast England. Condition: Good. Size: Medium, 3-5mm. All specimens from one sample.

Fig. 8a. *Potamopyrgus antipodarum* (RT6208, 55817) – Ape

One generic and specific difference: Lab 14 identified as *Heleobia charruana* (Figure 20a) (which has less tumid whorls and a sinuous parietal lip).

Labs 02 and 10b used the synonym *Potamopyrgus jenkinsi*. Lab 10a mis-spelled the genus as 'Potamopyrgos'.

RT6209 – *Philine denticulata* (J. Adams, 1800) (Figure 9a)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: north of Ireland. Condition: Fair (broken shells). Size: Small, 0.5-1mm. Specimens from two samples.

Fig. 9a. *Philine denticulata* (RT6209; 58710) – D

Ten generic and fifteen specific differences: Lab 02 identified as *Roxania utriculus* (Figures 9b-c); Lab 03 identified as *Cylichna alba* (Figures 9d-e); Lab 10b identified as *Scaphander lignarius* (Figures 9f-g); Labs 04, 06, 18 and 23 identified as *Diaphana minuta* (Figures 9h-i); Lab 05 identified as *Retusa obtusa* (Figure 11a); (all of which have a narrower aperture with the foot and mantle able to retract into the shell); Lab 12 identified as *Philine punctata* (Figure 9j) (which has a pitted shell sculpture); Labs 14 and 16 identified as *Philine quadripartita* (Figure 9k) (which has a completely internal shell – see Ohnheiser & Malaquias, 2013).

Lab 10a identified only as Philinidae. Labs 09, 17a and 17b identified only as *Philine* (mis-spelled as 'Philene' by Lab 09). Lab 20 did not attempt identification. It is recommended that laboratories attempt species level identification of all specimens.

Fig. 9b. *Roxania utriculus* (P4264, 64693) – D

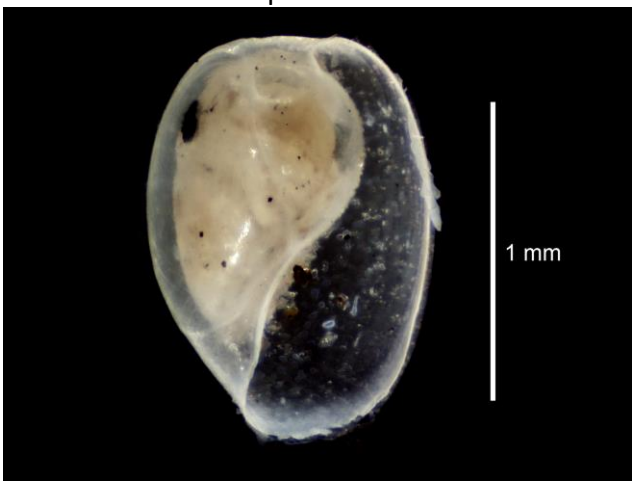

Fig. 9c. *Roxania utriculus* (P4264, 64693) – Ape

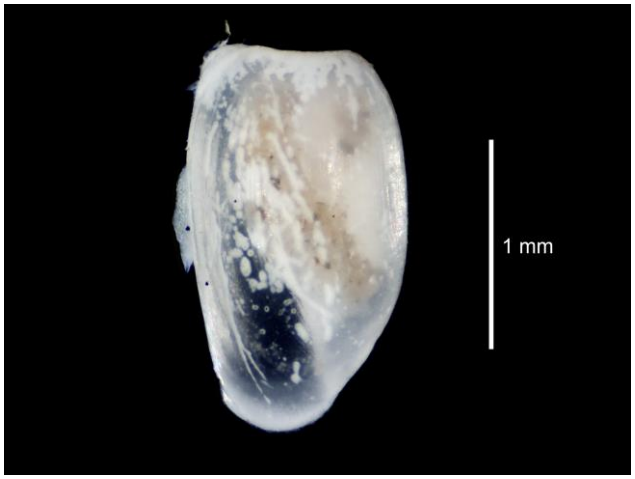

Fig. 9d. *Cylichna alba* (P863, SN13.4) – D

Fig. 9e. *Cylichna alba* (P863, SN13.4) – Ape

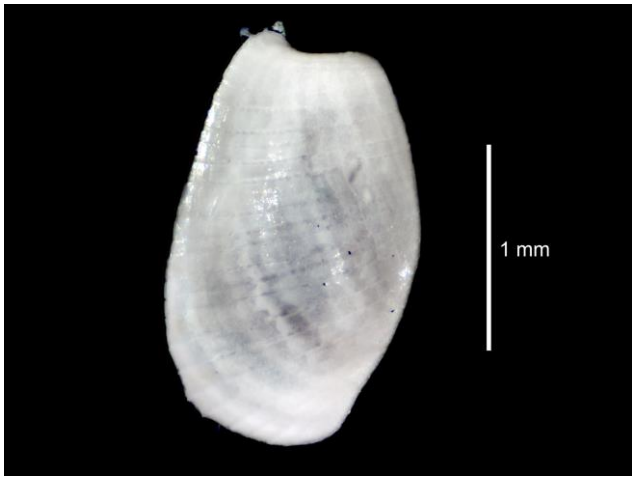

Fig. 9f. *Scaphander lignarius* (412202, 4787) – D

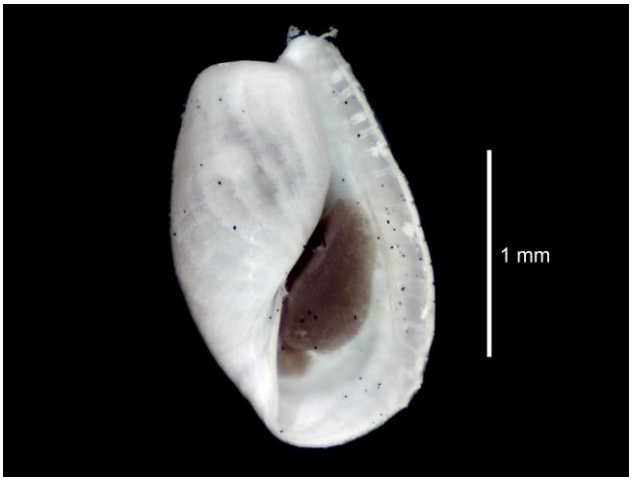

Fig. 9g. *Scaphander lignarius* (412202, 4787) – Ape

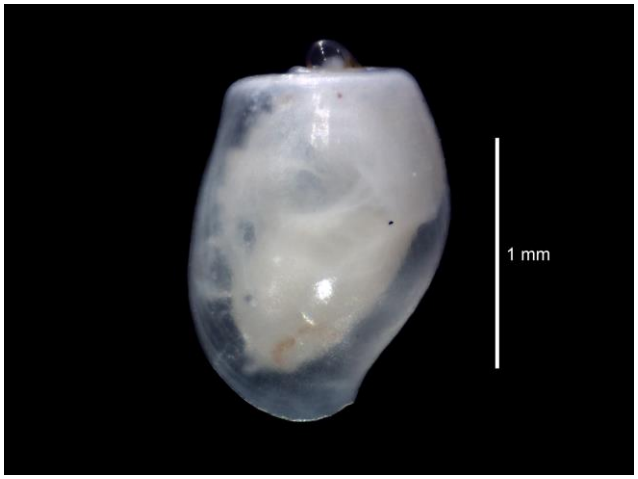

Fig. 9h. *Diaphana minuta* (P6764, 69557) – D

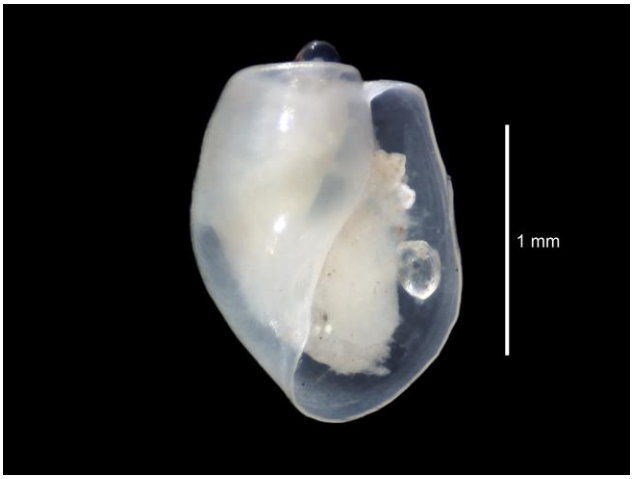

Fig. 9i. *Diaphana minuta* (P6764, 69557) – Ape

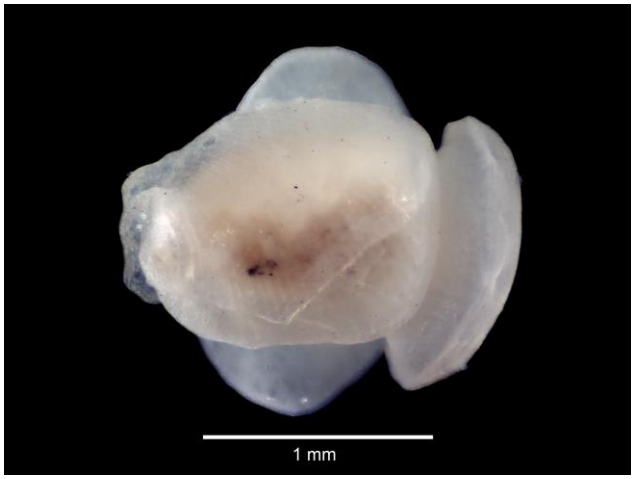

Fig. 9j. *Philine punctata* (P4389, 66629) – D

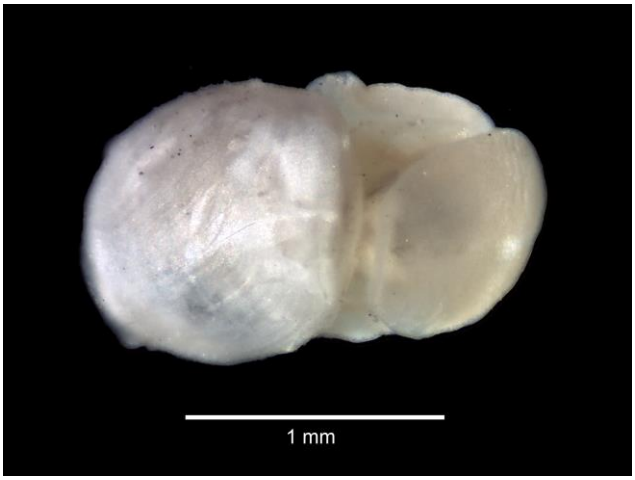

Fig. 9k. *Philine quadripartita* (P6764, 69557) – D

RT6210 – *Brachystomia eulimoides* (Hanley, 1844) (Figure 10a)

Substratum: Diamicton. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: north of Ireland. Condition: Good. Size: Medium, 1-2mm. Specimens from two samples.

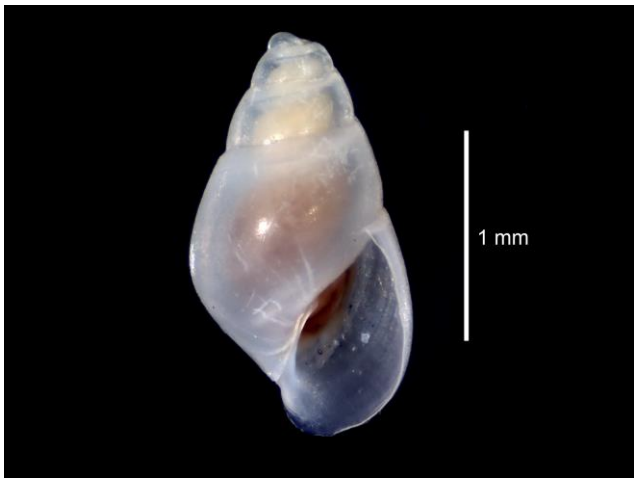

Fig. 10a. *Brachystomia eulimoides* (RT6210; 58672) – Ape

Three generic and five specific differences: Lab 10a identified as *Odostomia turrita* (Figure 10b shows an *Odostomia*, possibly *O. turrita*) (which has an exposed protoconch nucleus); Labs 10b and 11 identified as *Ondina diaphana* (no material available) (which has deeper sutures); Lab 02 identified as *Brachystomia lukisi* (no material available) (which has a glossy porcelaneous shell – see Høisæter, 2014); Lab 20 identified as *Brachystomia scalaris* (Figure 10c) (which has a broader shell).

Lab 04 mis-spelled the genus name as 'Brachyostomia'.

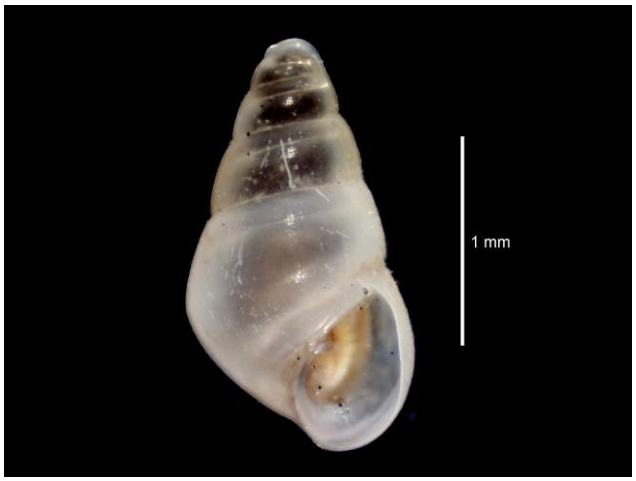

Fig. 10b. *Odostomia* c.f. *turrita* (413379, 9731) – Ape

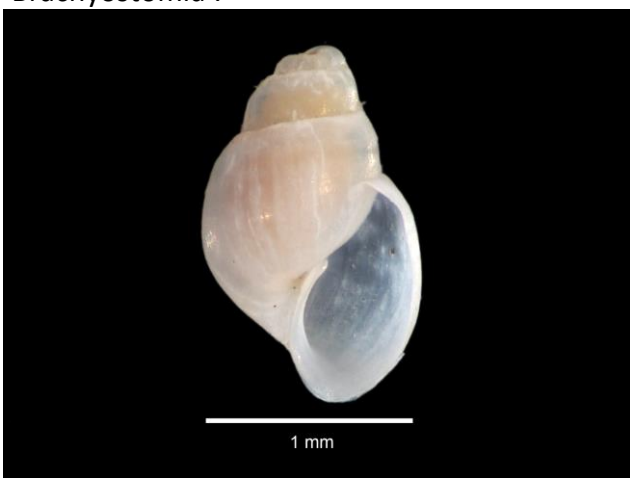

Fig. 10c. *Brachystomia scalaris* (P3161, 62689) – Ape

RT6211 – *Retusa obtusa* (Montagu, 1803) (Figure 11a)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: northern Scotland. Condition: Good. Size: Medium, 1-2mm. Specimens from three samples.

Fig. 11a. *Retusa obtusa* (RT6211; 60776) – Ape

No generic or specific differences recorded.

RT6212 – *Ecrobia ventrosa* (Montagu, 1803) (Figure 12a)

Substratum: Floral turf. Salinity: Reduced (Mesohaline). Depth: Infralittoral. Geography: southeast England. Condition: Good. Size: Medium, 3-5mm. Specimens from two samples.

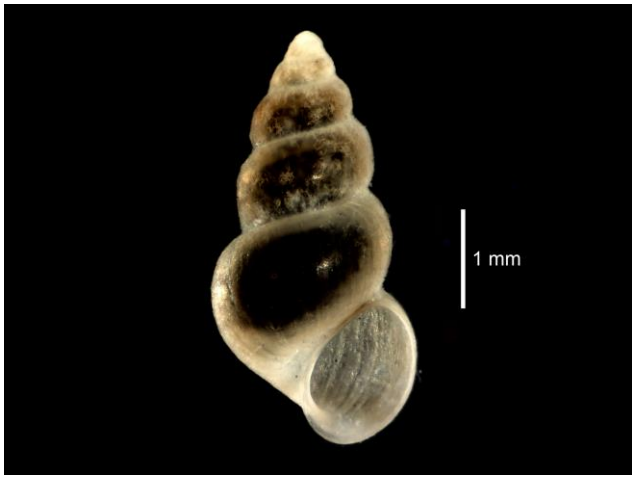

Fig. 12a. *Ecrobia ventrosa* (RT6212; 55818) – Ape

Four generic and specific differences: Labs 04, 17a and 17b identified as *Hydrobia acuta neglecta* (Figure 04b) (which has shallower sutures); Lab 10a identified as *Potamopyrgus antipodarum*? (Figure 04b) (which has a broader shell for the same number of whorls).

Lab 02 used the synonym *Hydrobia ventrosa*.

RT6213 – *Retusa umbilicata* (Montagu, 1803) (Figure 13a)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Circalittoral (Lower Shelf). Geography: North Sea. Condition: Good. Size: Medium, 1-2mm. Specimens from two samples.

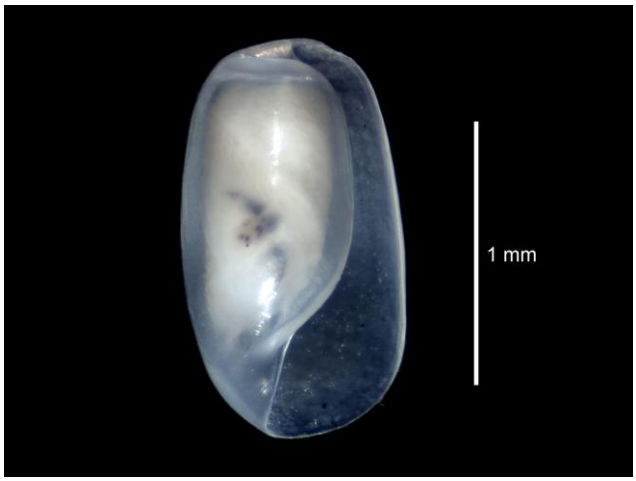

Fig. 13a. *Retusa umbilicata* (RT6213; 63781) –

Three generic and four specific differences: Labs 10a, 17a and 17b identified as *Cylichna alba* (Figures 09d-e) (which has a broader shell at this size); Lab 23 identified as *Retusa truncatula* (Figure 02a) (which has a narrower upper half of the shell, relative to the base).

Ape

RT6214 – *Steromphala umbilicalis* (da Costa, 1778) (Figure 14a-c)

Substratum: Hard substrata. Salinity: Full (Euhaline). Depth: Intertidal. Geography: southwest England. Condition: Good. Size: Medium, 14-16mm. All specimens from one sample.

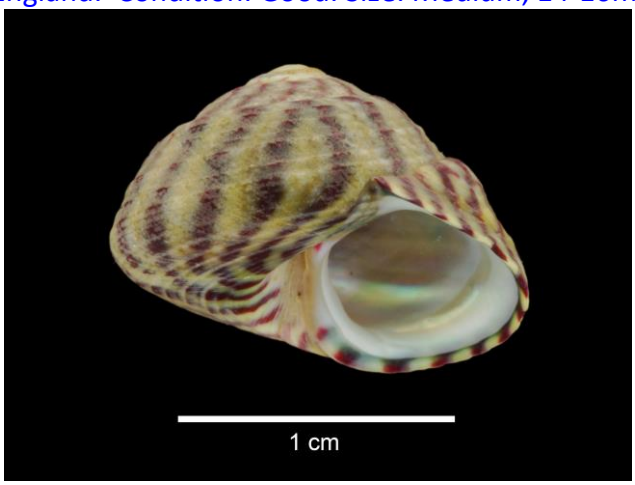

Fig. 14a. *Steromphala umbilicalis* (RT6214, DH) – Ape

Three specific differences: Lab 07 identified as *Steromphala cineraria* (Figures 14d-e & h); Lab 10a identified as *Gibbula cineraria*, a synonym of *S. cineraria* (which has finer sculpture and patterning); Lab 10b identified as *Gibbula pennanti*, a synonym of *Steromphala pennanti* (Figures 14f-g & i) (which has a smaller umbilicus);

Labs 04 and 16 recorded *Gibbula umbilicaris*, a synonym of *Steromphala umbilicaris*, a Mediterranean species that does not closely resemble *S umbilicalis*; the differences have been assumed to be spelling errors and accepted as correct on this occasion but would have caused problems from a data perspective. Labs 02 and 14 used the synonym *Gibbula umbilicalis*.

Fig. 14b. *Steromphala umbilicalis* (RT6214, DH) – D

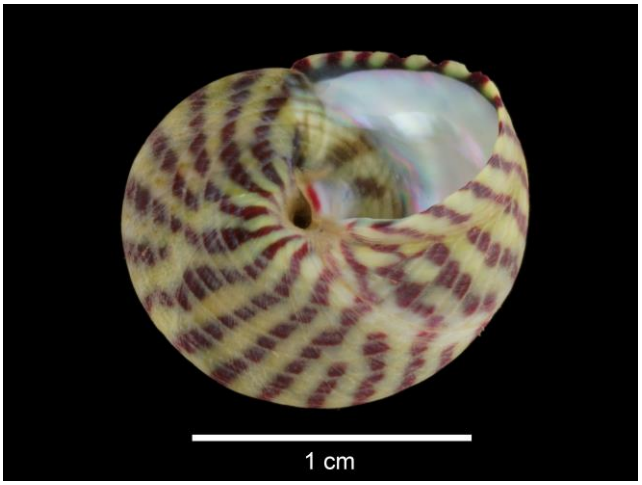

Fig. 14c. *Steromphala umbilicalis* (RT6214, DH) – V

Fig. 14d. *Steromphala cineraria* (TW) – D

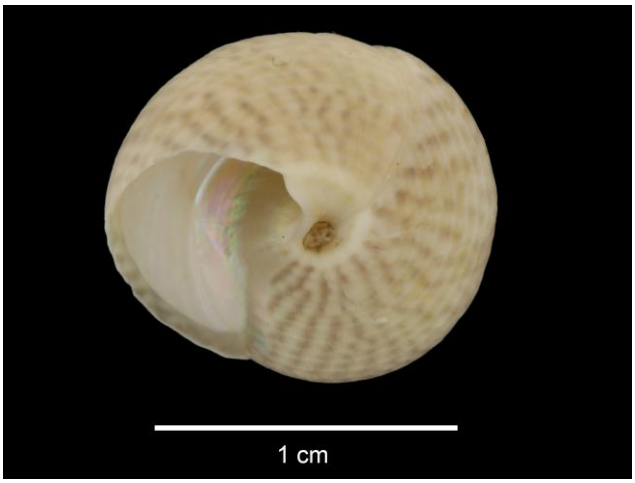

Fig. 14e. *Steromphala cineraria* (TW) – V

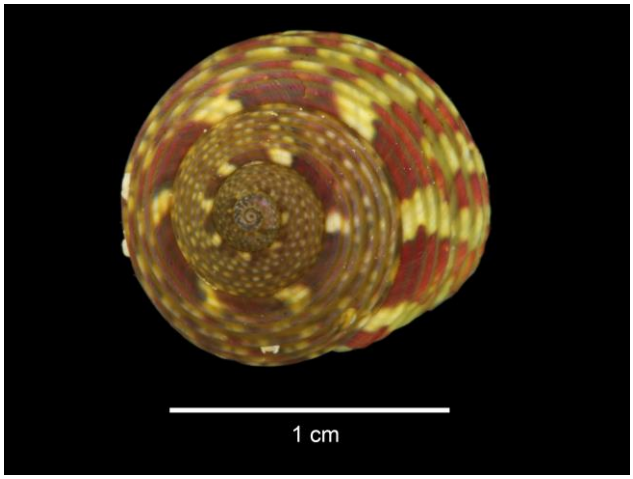

Fig. 14f. *Steromphala pennanti* (TW) – D

Fig. 14g. *Steromphala pennanti* (TW) – V

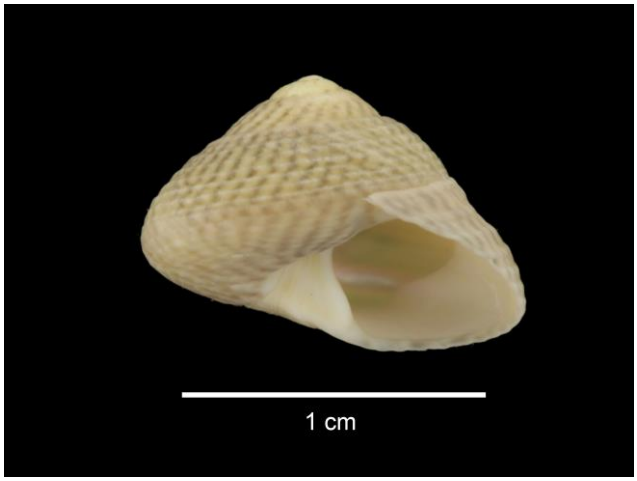

Fig. 14h. *Steromphala cineraria* (TW) – Ape

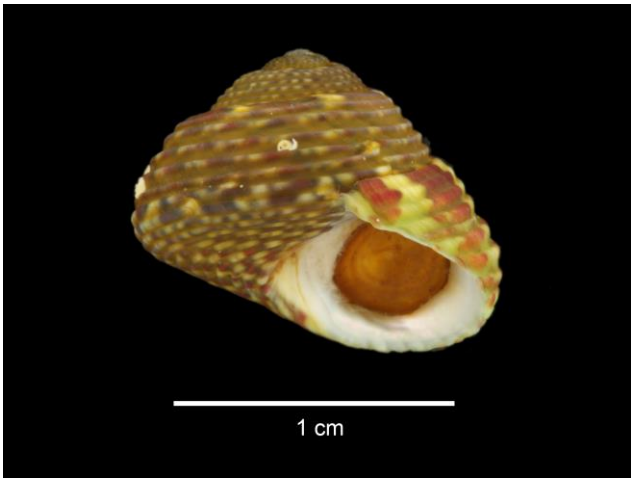

Fig. 14i. *Steromphala pennanti* (TW) – Ape

RT6215 – *Eulimella acicula* (Philippi, 1836) (Figure 15a)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: north of Ireland. Condition: Fair. Size: Medium, 2-3mm. Specimens from four samples.

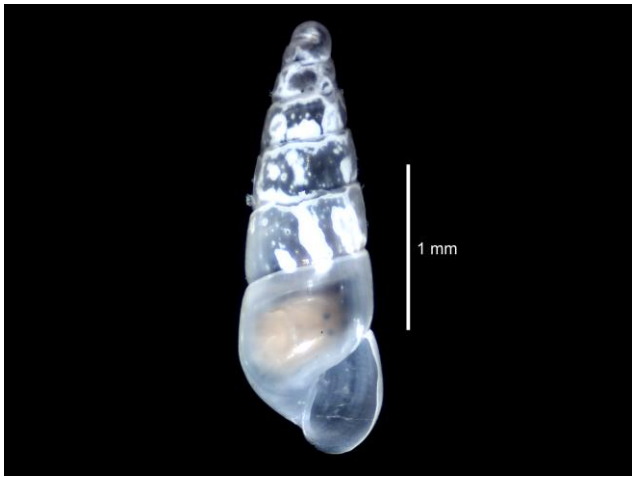

Fig. 15a. *Eulimella acicula* (RT6215; 58708) – Ape

Four generic and eight specific differences: Lab 10a identified as *Jordaniella truncatula* (no material available) (which has an intorted protoconch); Lab 09 identified as *Turbonilla lactea* (Figure 15b; Figure 15c shows *T. acuta*) (which has strong axial sculpture); Lab 18 identified as *Odostomia plicata* (Figure 15d); Lab 23 identified as *Odostomia unidentata* (Figure 15e) (both of which have shorter, more conical shells); Labs 07 and 12 identified as *Eulimella scillae* (no material available) (which has less tumid whorls); Lab 02 identified as *Eulimella ventricosa* (Figure 15f) (which has deeper sutures and a more planorboid protoconch); Lab 14 identified as *Eulimella compactlis* (no material available) (which has a more flat sided shell outline – see Høisæter, 2014).

Lab 10b used the synonym *Eulimella laevis*.

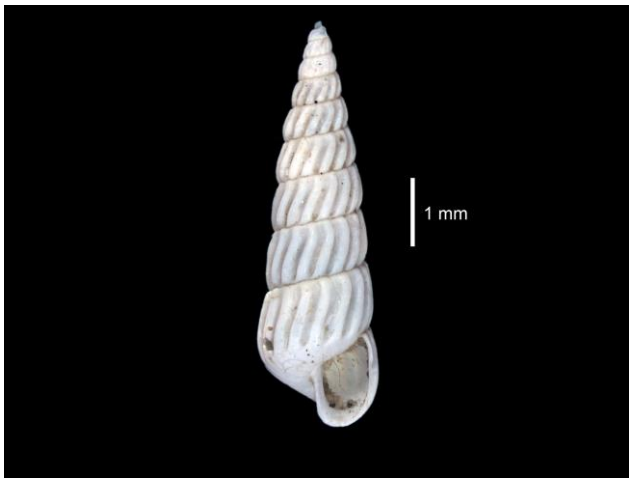

Fig. 15b. *Turbonilla lactea* (TW) – Ape

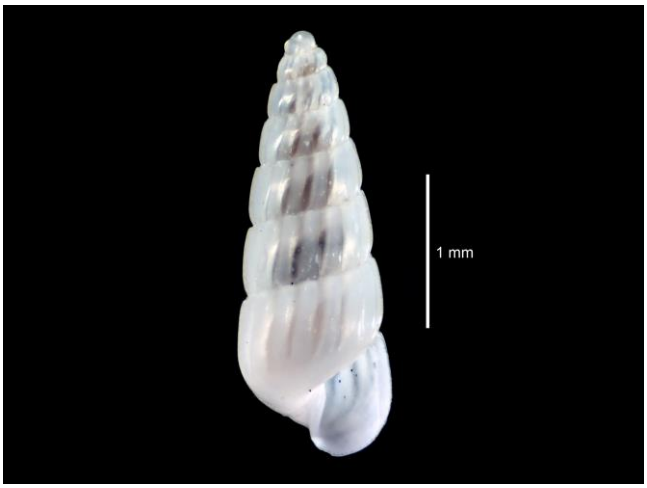

Fig. 15c. *Turbonilla acuta* (412692, 6920) – Ape

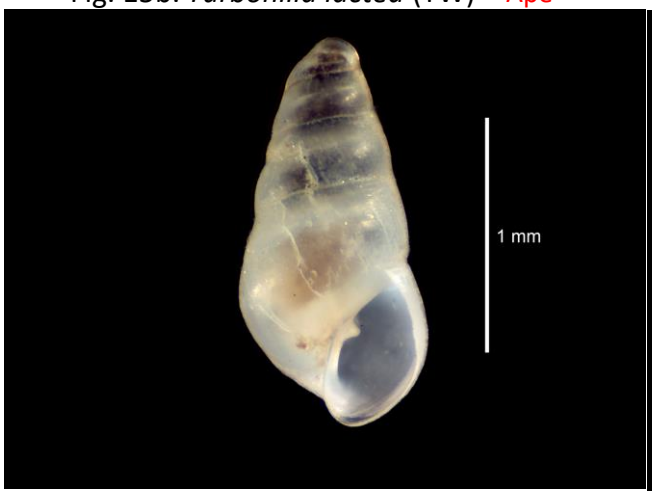

Fig. 15d. *Odostomia* c.f. *plicata* (413273, 9588) – Ape

Fig. 15e. *Odostomia unidentata* (413273, 9594) – Ape

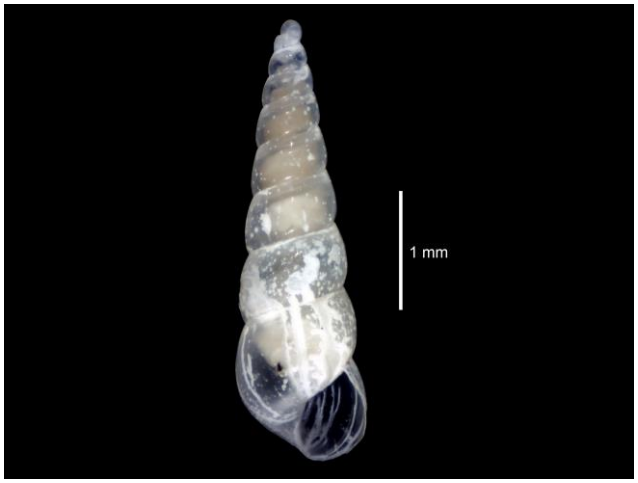

Fig. 15f. *Eulimella ventricosa* (P3865, 63422) – Ape

RT6216 – *Margarites helicinus* (Phipps, 1774) (Figures 16a-c)

Substratum: Floral turf. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: northern Scotland. Condition: Good. Size: Small, 1-1.5mm. All specimens from one sample.

Fig. 16a. *Margarites helicinus* (RT6216 ; 61646) – Ape

Fifteen generic and specific differences: Labs 17a, 17b and 20 identified as *Skeneopsis planorbis* (Figures 16d-e, l) (which has a larger umbilicus); Lab 14 identified as *Dikoleps nitens* (Figures 16f-g, m) (which lacks spiral sculpture); Lab 10a identified as *Tornus univulcatus*, a synonym of *Tjaernoeia unisulcata* (no material available; Figures 16h-l, n show *Tjaernoeia exquisita*) (which has an anal sinus); Labs 03, 05, 06, 08, 09, 10b, 11, 16, 18 and 23 identified as *Skenea serpuloides* (Figures 16j-k, o) (which lacks iridescence within the aperture and has stronger basal spiral sculpture).

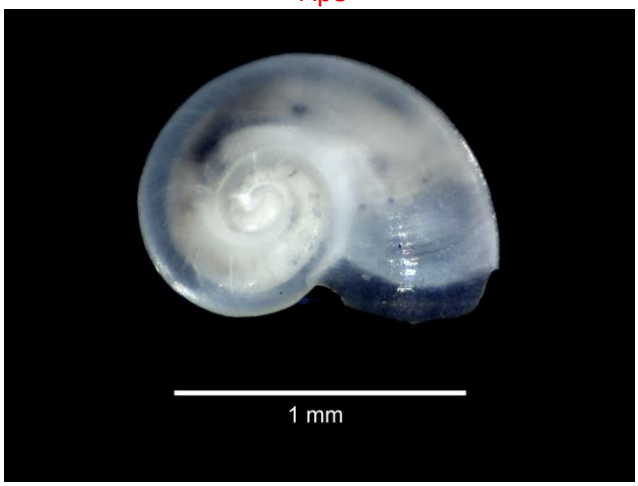

Fig. 16b. *Margarites helicinus* (RT6216; 61646) – D

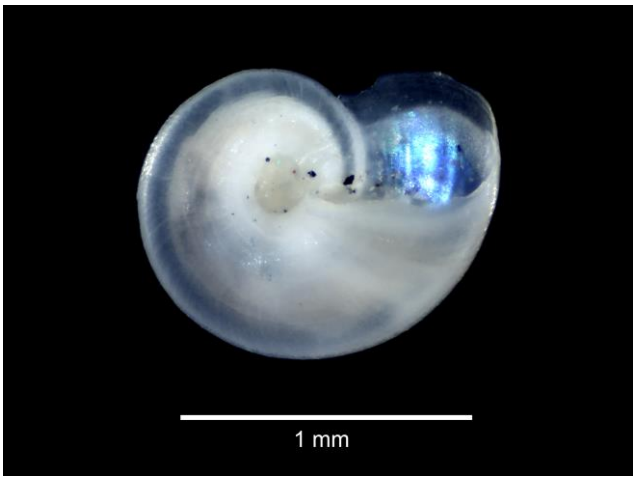

Fig. 16c. *Margarites helicinus* (RT6216 ; 61646) – V

Fig. 16d. *Skeneopsis planorbis* (RT5920 ; TW) – D

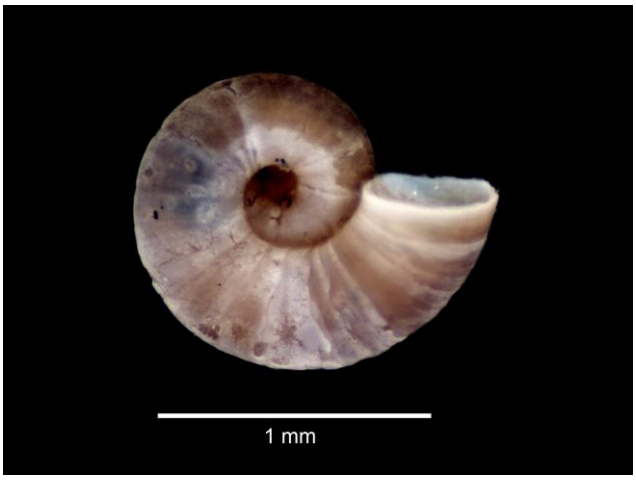

Fig. 16e. *Skeneopsis planorbis* (RT5920 ; TW) – V

Fig. 16f. *Dikoleps nitens* (3064.3, 61815) – D

Fig. 16g. *Dikoleps nitens* (3064.3, 61815) – V

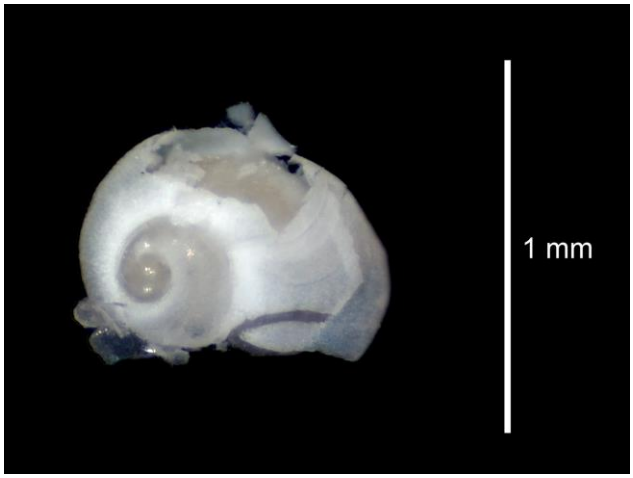

Fig. 16h. *Tjaernoeia exquisita* (P6808.1, 69359) – D

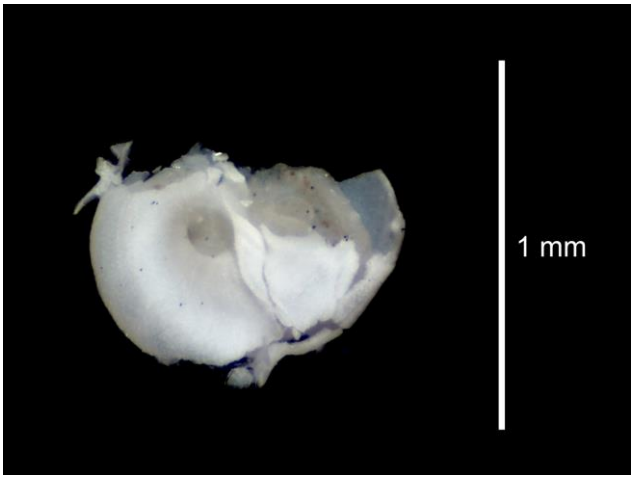

Fig. 16i. *Tjaernoeia exquisita* (P6808.1, 69359) – V

Fig. 16j. *Skenea serpuloides* (412692, 6924) – D

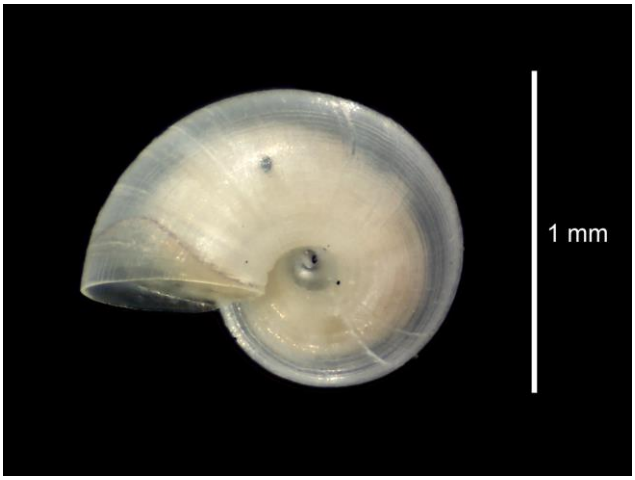

Fig. 16k. *Skenea serpuloides* (412692, 6924) – V

Fig. 16l. *Skeneopsis planorbis* (RT5920 ; TW) – Ape

Fig. 16m. *Dikoleps nitens* (3064.3, 61815) – Ape

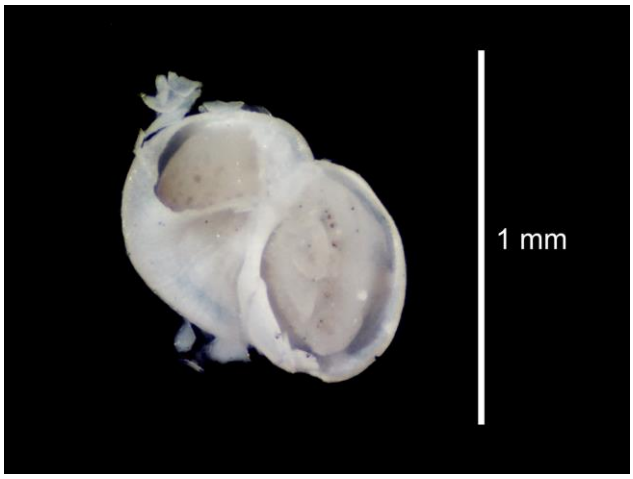

Fig. 16n. *Tjaernoeia exquisita* (P6808.1, 69359) – Ape

Fig. 16o. *Skenea serpuloides* (412692, 6924) – Ape

RT6217 – *Obtusella intersecta* (S. Wood, 1857) (Figure 17a)

Substratum: Sand. Salinity: Full (Euhaline). Depth: Circalittoral (Lower Shelf). Geography: North Sea. Condition: Fair. Size: Small, 0.5-1mm. Specimens from two samples.

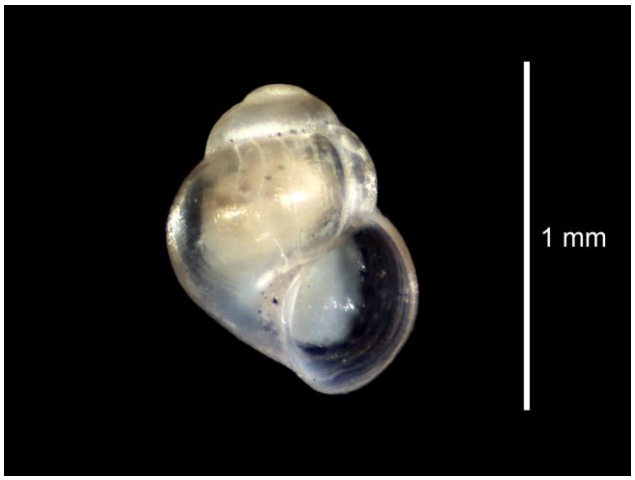

Fig. 17a. *Obtusella intersecta* (RT6217 ; 61381) – Ape

Seven generic and specific differences: Labs 02, 10b and 16 identified as *Rissoella opalina* (Figure 17b); Labs 02, 10b and 16 identified as *Rissoella diaphana* (Figure 17b) (both of which have an internal opercular ridge, a more prosocline aperture and lack any trace of spiral sculpture); Lab 10a identified as *Paludinella littorina* (no material available) (which has a more prosocline aperture and lacks any trace of spiral sculpture).

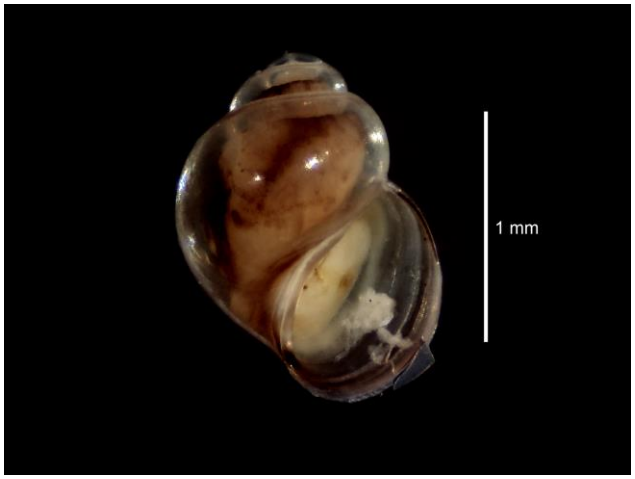

Fig. 17b. *Rissoella opalina* (P529, 59869) – Ape

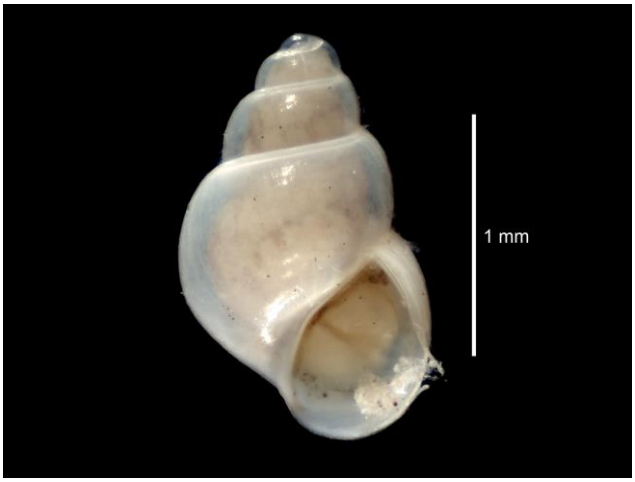

Fig. 17c. *Rissoella diaphana* (P529, 58332) – Ape

RT6218 – *Lacuna vincta* (Montagu, 1803) (Figures 18a)

Substratum: Floral turf. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: northern Scotland. Condition: Good. Size: Small, 2-2.5mm. Specimens from two samples.

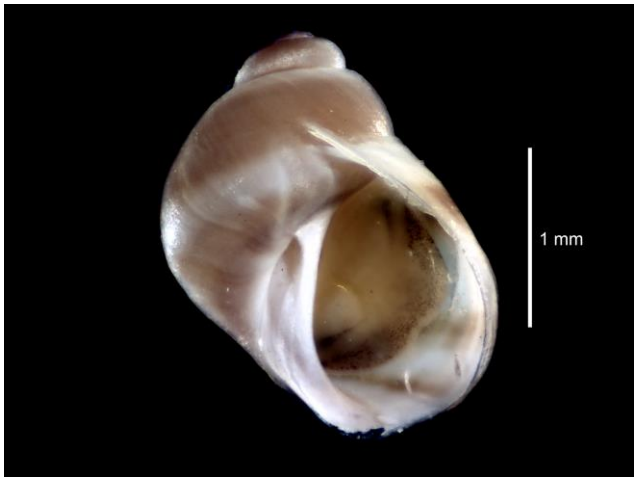

Fig. 18a. *Lacuna vincta* (RT6218; 61885) – Ape

One generic and two specific differences: Lab 10a identified as *Cingulopsis fulgida*, a synonym of *Eatonina fulgida* (Figure 18b), (which has more numerous and more tumid whorls at this size); Lab 23 identified as *Lacuna parva* (Figure 18c), (which has a lower spire).

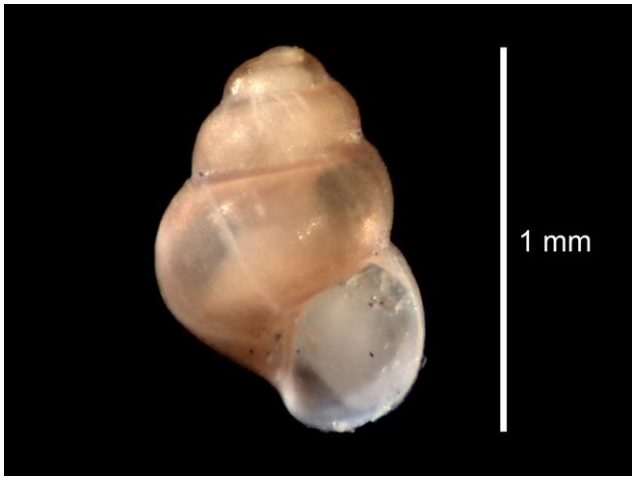

Fig. 18b. *Eatonina fulgida* (TW) – Ape

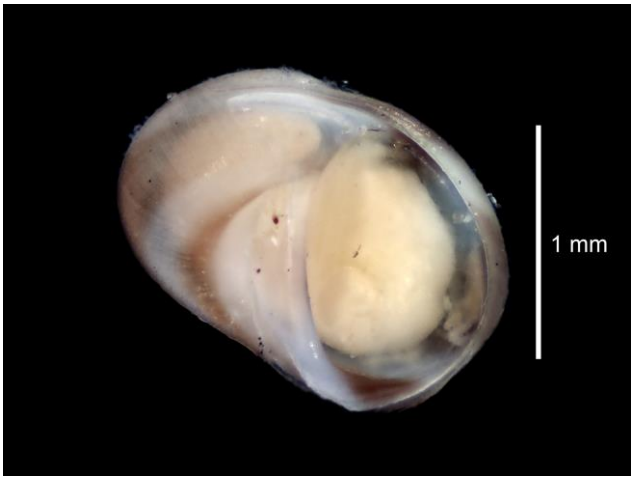

Fig. 18c. *Lacuna parva* (P4652.1, 66375) – Ape

RT6219 – *Onoba semicostata* (Montagu, 1803) (Figure 19a)

Substratum: Diamicton. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: southeast England. Condition: Good. Size: Medium, 2-3mm. All specimens from one sample.

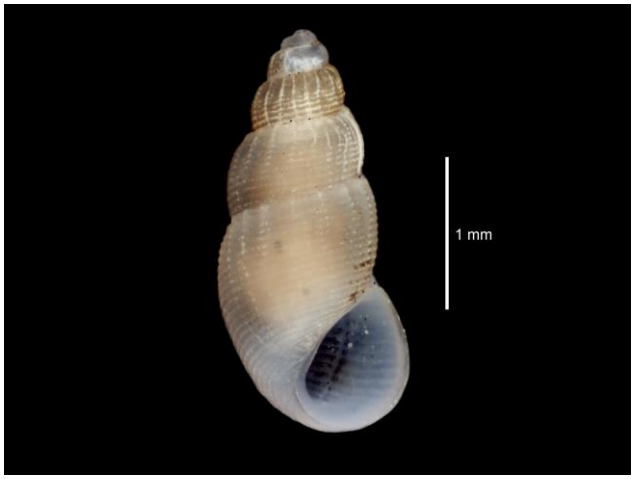

Fig. 19a. *Onoba semicostata* (RT6219; 11347) – Ape

No generic or specific differences recorded.

Labs 17a and 17b mistakenly transposed their data for specimens 19 and 20; these administrative errors have been corrected for this report.

RT6220 – *Heleobia charruana* (d'Orbigny, 1841) (Figure 20a)

Substratum: Diamicton. Salinity: Low (Oligohaline). Depth: Infralittoral. Geography: southeast England. Condition: Good. Size: Medium, 3-4mm. All specimens from one sample.

Fig. 20a. *Heleobia charruana* (RT6220; 63276) – Ape

12 generic and specific differences: Lab 17a identified as *Rissoa* sp. (Figure 06a shows *Rissoa parva*); Lab 17b identified as *Pusillina inconspicua* (Figure 20b) (both of which typically have colour patterns and more opisthocline apertures); Labs 04 and 16 identified as *Bithynia tentaculata* (Figure 20c) (which has a calcareous operculum and a broader shell with fewer whorls at this size); Lab 02 identified as *Hydrobia neglecta*, currently *Hydrobia acuta neglecta* (Figure 4b); Labs 03, 07, 19, 20 and 23 identified as *Peringia ulvae* (Figure 04a); Labs 10a and 10b identified as *Hydrobia ulvae*, a synonym of *Peringia ulvae* (both of which have a more cryptoconoid spire and less sinuous parietal lip).

Fig. 20b. *Pusillina inconspicua* (414024, 54828) – Ape

Fig. 20c. *Bithynia tentaculata* (412525, 9366) – Ape

RT6221 – *Philine quadripartita* Ascanius, 1772 (Figure 21a)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: western Scotland. Condition: Fair. Size: Small, 3-5mm. Specimens from four samples.

Fig. 21a. *Philine quadripartita* (RT6221; 67514) – D

Two generic and ten specific differences: Lab 14 identified as *Hermania scabra* (Figure 21b shows a *Hermania* species that may be *H. scabra*); Lab 18 identified as *Laona quadrata* (Figure 21c) (both of which have pitted sculpture); Labs 02, 07, 10b, 17a, 17b, 20 and 23 identified as *Philine aperta* (no material available; a southern African species that has at times been considered a senior synonym of *P. quadripartita*).

Lab 10a identified only as '*Philine* sp?'. It is recommended that laboratories attempt species level identification of all specimens. Lab 09 mis-spelled the specific name as '*quadripartitia*'.

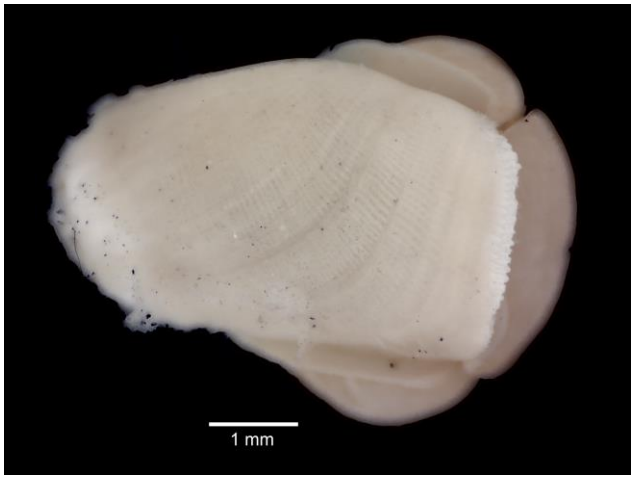

Fig. 21b. *Hermania* species (P6993, 69807) – D

Fig. 21c. *Laona quadrata* (P3183, 62446) – D

RT6222 – *Ebala nitidissima* (Montagu, 1803) (Figure 22a)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: northern Scotland. Condition: Good. Size: Medium, 2-3mm. All specimens from one sample.

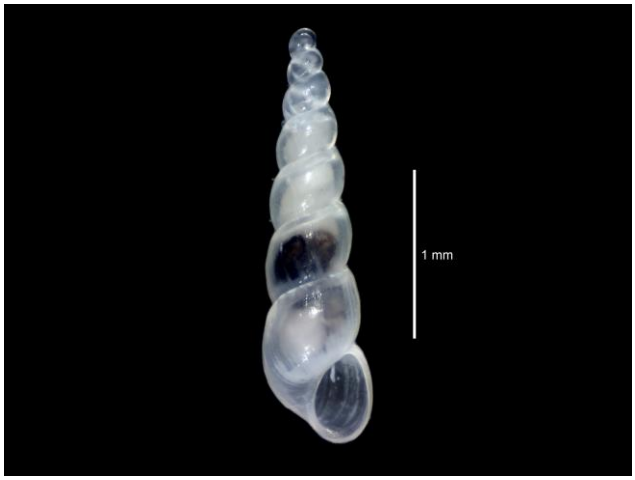

Fig. 22a. *Ebala nitidissima* (RT6222; 60784) – Ape

Five generic and specific differences: Lab 09 identified as *Graphis albida* (Figure 22b) (which has strong axial sculpture); Labs 04, 14, 18 and 23 identified as *Eulimella ventricosa* (Figure 15f) (which has a broader shell).

Lab 10a mis-spelled the generic name as '*Ebalia*', which is a genus of decapod Crustacea.

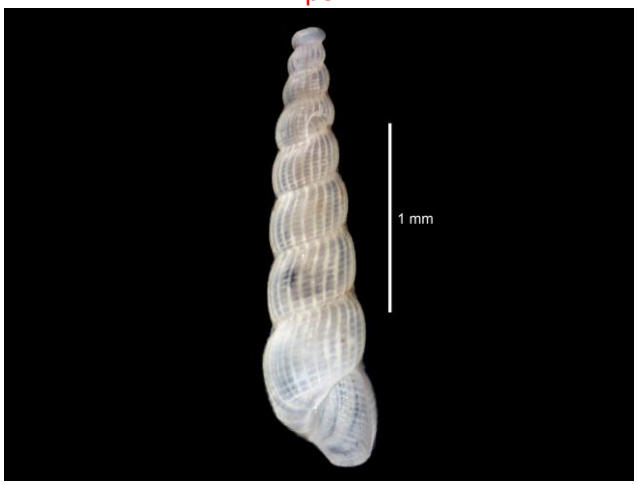

Fig. 22b. *Graphis albida* (P4162.1, 65253) – Ape

RT6223 – *Assiminea grayana* J. Fleming, 1828 (Figure 23a)

Substratum: Mud. Salinity: Reduced (Mesohaline). Depth: Intertidal. Geography: southeast England. Condition: Fair. Size: Medium, 2-3mm. Specimens from four samples.

Fig. 23a. *Assiminea grayana* (RT6223; 60082) – Ape

One generic and specific difference: Lab 23 identified as *Peringia ulvae* (Figure 04a) (which has a narrower shell that lacks chestnut brown colouring).

Lab 10a mis-spelled the generic name as '*Assinea*'.

RT6224 – *Akera bullata* O.F. Müller, 1776 (Figures 24a-c)

Substratum: Diamicton. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: northern Scotland. Condition: Fair. Size: Medium, 4-8mm. Specimens from three samples.

Fig. 24a. *Akera bullata* (RT6224; 60768) – D

Seven generic and specific differences: Lab 23 identified as *Hermania scabra* (Figure 21b shows a *Hermania* species that may be *H. scabra*) (which has pitted sculpture); Labs 10a and 12 identified as *Diaphana minuta* (Figures 9h-i); Lab 14 identified as *Retusa obtusa* (Figure 11a) (both of which have a narrower aperture with the foot and mantle able to retract into the shell); Lab 02 identified as *Haminoea navicula* (Figures 24d-e, h show a *Haminoea* species); Lab 03 identified as *Roxania utriculus* (Figures 24f-g, i) (both of which lack channelled sutures visible at the apex).

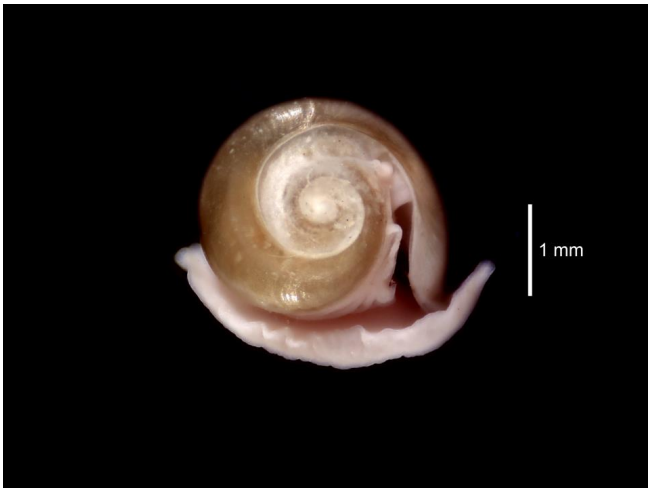

Fig. 24b. *Akera bullata* (RT6224; 60768) – apical

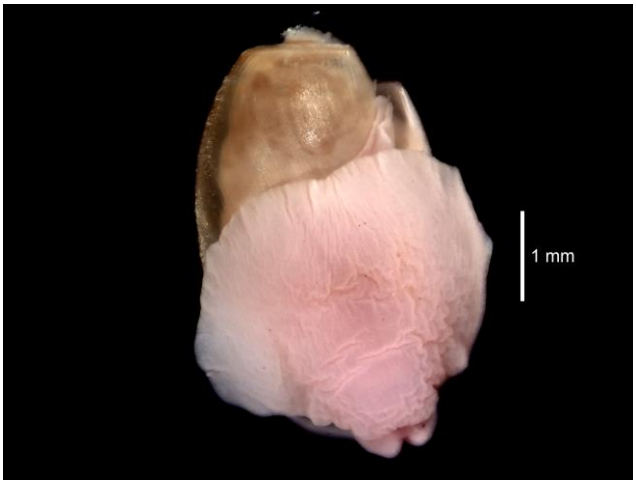

Fig. 24c. *Akera bullata* (RT6224; 60768) – V

Fig. 24d. *Haminoea* sp. (414268, 55595) – apical

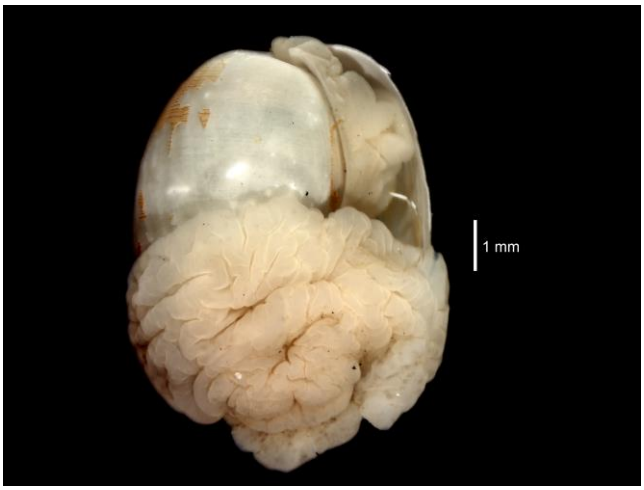

Fig. 24e. *Haminoea* sp. (414268, 55595) – V

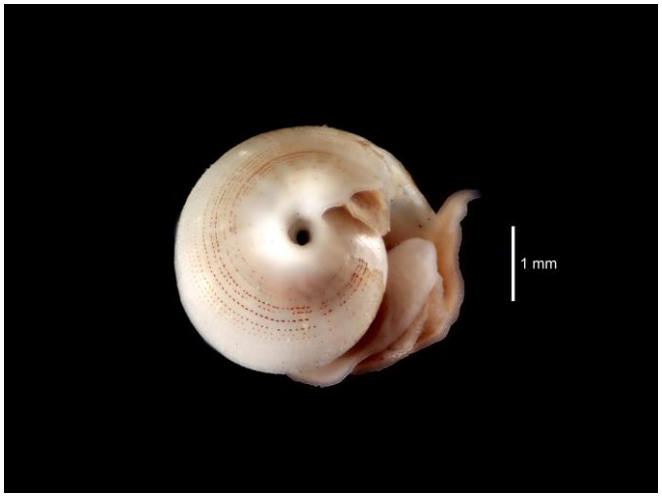

Fig. 24f. *Roxania utriculus* (413251, 9566) – apical

Fig. 24g. *Roxania utriculus* (413251, 9566) – V

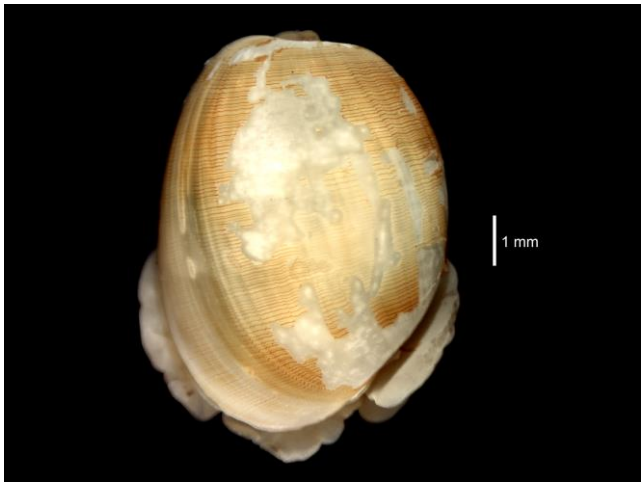

Fig. 24h. *Haminoea* sp. (414268, 55595) – D

Fig. 24i. *Roxania utriculus* (413251, 9566) – D

RT6225 – *Lacuna pallidula* (da Costa, 1778) (Figure 25a)

Substratum: Floral turf. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: northern Scotland. Condition: Good. Size: Small, 0.5-1.5mm. All specimens from one sample.

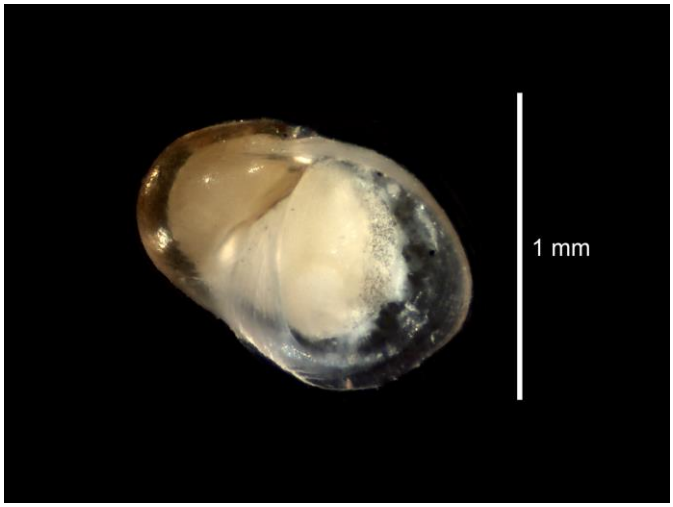

Fig. 25a. *Lacuna pallidula* (RT6225; 61647) – Ape

Eight generic and nine specific differences: Labs 07, 10a and 17a identified as *Velutina velutina* (Figure 25b) (which has strong spiral sculpture); Labs 17b and 18 identified as *Margarites helicinus* (Figures 16a-c); Lab 10b identified as *Littorina obtusata* (Figure 25c); Lab 14 identified as *Littorina obtusa*, a mis-spelling of *L. obtusata*; Lab 02 identified as *Littorina mariae*, a synonym of *L. fabalis* (Figure 25d) (all of which lack an umbilical chink); Lab 20 identified as *Lacuna parva* (Figure 18c) (which has spiral bands).

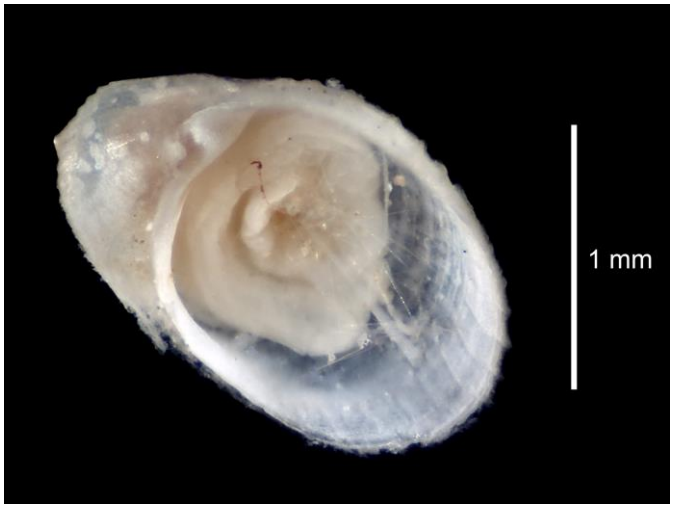

Fig. 25b. *Velutina velutina* (P4272, 64832) – Ape

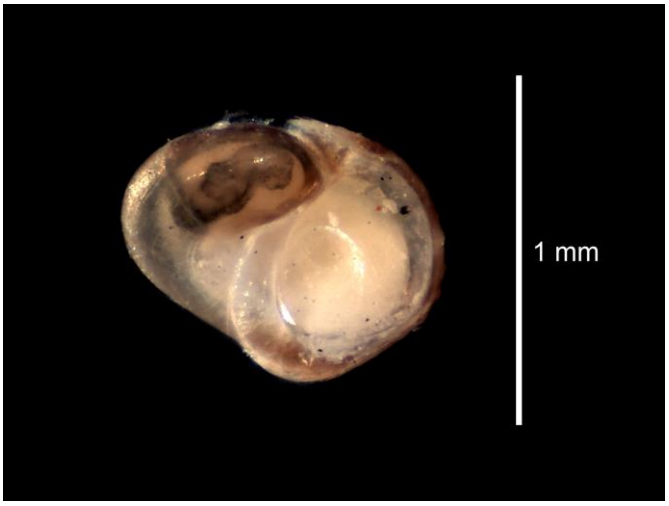

Fig. 25c. *Littorina obtusata* (P529, 58332) – Ape

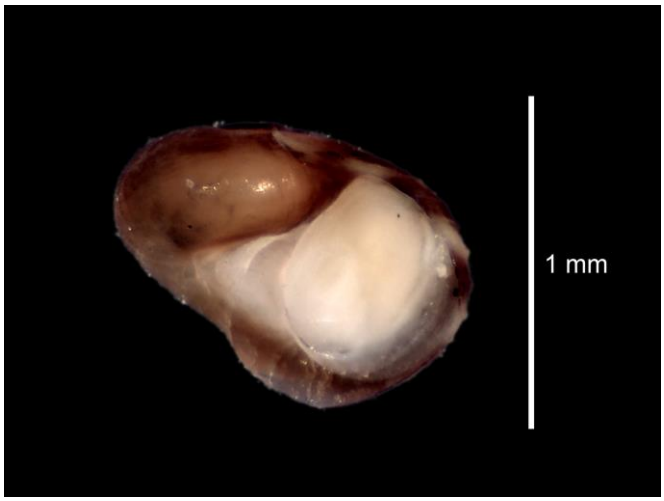

Fig. 25d. *Littorina fabalis* (P4652.1, 66368) – Ape

Taxonomic and Identification policy problems highlighted by this RT

An important purpose for the ring test exercises is to highlight areas for further work in identification standardisation and taxonomic research. Several identification problems were highlighted through this exercise, discussed above. Some notes for discussion of progress towards a taxonomic discrimination protocol (TDP) are included below.

Trochidae (Specimen 14). The draft TDP suggests species identifications for trochids, without separation of juveniles, as currently done at APEM. Separation of juveniles varies between labs and there have been other identification problems and inconsistencies noted in previous circulations and audits, often resulting from attempting to use the umbilicus features given by Graham (1988), which do not consistently work, even for quite large specimens. The updates to the series (e.g. Wigham & Graham., 2017) are effectively reprints with nomenclature updates but little other new information. Smith (2019) gives updated identification features for *Steromphala*. All labs correctly identified the genus for the circulated specimen (although there were some nomenclature updates) but there were a few species level differences. The specimen was fully grown and most identification discrepancies in the family are known (from audits) to be for smaller specimens, which may require discussion. There are many trochids that are found in samples that represent different habitats, some rare; most are found in low numbers in macrobenthos samples.

Margaritidae (Specimen 16). The draft TDP suggests species identifications for margaritids (previously included with Trochidae) without separation of juveniles, as currently done at APEM. The circulated specimen had the joint largest number of discrepancies of the RT (15, all at family level). The specimens were small and the species would have been unfamiliar to many labs due to its habitat and distribution. With experience and reference collection audits, it should be identifiable. There are few other species in the family, all rare.

Littorinidae (Specimens 18 and 25). The draft TDP suggests species identifications for littorinids without separation of juveniles, as currently done at APEM. Both circulated specimens were small *Lacuna*. Most labs correctly identified *L. vincta* but *L. pallidula* generated 9 discrepancies, most at genus or family level. As with *Margarites*, the typical habitats cause littorinids to be uncommon in benthos samples aimed at infauna but they should be identifiable, or correctable, with experience and reference collection audits. Littorinids are mainly intertidal and more commonly recorded in situ; most species are found only in low numbers in macrobenthos samples.

Rissoidae (Specimens 06, 07, 17 and 19). The draft TDP suggests species identifications for rissoids without separation of juveniles, as currently done at APEM. All circulated specimens generated some discrepancies, few for *Rissoa parva* and *Onoba* spp. but seven for *Obtusella intersecta*. Different species in the family are more or less familiar and *O. intersecta* is difficult due to its lack of clear distinguishing features but experience should allow all to be identifiable. Rissoidae is a large family, including species that represent different habitats and distribution patterns, with several that are rare or at the edge of their range in British waters.

Hydrobiidae (Specimens 04 and 12). The draft TDP suggests species identifications for hydrobiids without separation of juveniles, as currently done at APEM. The circulated specimens were both near full size and generated few discrepancies. Smaller specimens have previously caused many problems. It is likely that there are fewer problems in real samples, as they usually include many more specimens to allow size comparisons and occasional extraction of animals from shells, for confirmation. Hydrobiids are important for conservation assessments and salinity indication. some former hydrobiid species have recently been moved into other families (see below).

Cochliopidae (Specimen 20). The draft TDP suggests species identifications for cochliopids (previously included with Hydrobiidae) without separation of juveniles, as currently done at APEM; there are two named (one of conservation importance, the other non-native) and one un-named (probably non-native) British species. There were twelve discrepancies in participants' identifications, mostly confusions with similar hydrobiids. While separation of hydrobioids will probably always cause some problems, especially for single specimens, it is likely that many of the differences were due to unfamiliarity with a species only recently named for the UK fauna. Species level identification would be best retained.

Tateiidae (Specimen 08). The draft TDP suggests species identifications for the single UK tateid (*Potamopyrgus antipodarum*, previously included with Hydrobiidae) without separation of juveniles, as currently done at APEM. Most labs correctly identified the circulated specimen, but smaller individuals have caused problems in previous circulations. As the species is usually present in large numbers, size-related problems should be less frequent in real samples. Species level identification is best retained. The species is non-native, often abundant and a useful salinity indicator.

Assimineidae (Specimen 23). The draft TDP suggests species identifications for assimineids (two UK spp.) without separation of juveniles, as currently done at APEM. Most labs correctly identified the circulated specimen, but the other species was named for a circulated rissoid. Species level identification can be considered practicable. The two species are useful habitat indicators, with conservation importance.

Iravadiidae (Specimen 05). The draft TDP suggests species identifications for iravadiids (two UK spp.) without separation of juveniles, as currently done at APEM. All labs correctly identified the circulated specimen and species level identifications can be recommended. Iravadiids can be habitat indicators and the other species is uncommon.

Caecidae (Specimen 01). The draft TDP suggests species identifications for caecids without separation of juveniles, as currently done at APEM. All labs correctly identified the circulated specimen and species level identifications can be recommended. A similar species has conservation importance.

Eulimidae (Specimen 03). The draft TDP flags Eulimidae for further work, due to different taxonomic levels currently used for different taxa by different labs, including variation in the recognition of juvenile sizes. All labs correctly identified the circulated specimen but problems remain for other species in the family, as seen in previous ring tests. There are many eulimid species in northern European waters and identification is difficult, especially for the (majority) colourless species. Several species are rare or poorly known and there are several recent newly recorded species for UK waters. There have also been nomenclatural and generic assignment changes. As ectoparasites on echinoderms (though usually found unattached), they have potential as indicator species. Further discussion is required but use of 'juvenile' in the family is best avoided, as it is usually impossible to distinguish juveniles unless the species name is known.

Murchisonellidae (Specimen 22). The draft TDP suggests species identifications for the single UK murchisonellid (previously included with Pyramidellidae) without separation of juveniles, as currently done at APEM. Most labs correctly identified the circulated specimen, several identified it as a similar member of the Pyramidellidae (the species was once included in the same genus). With experience and audits, identification should be possible. *Ebala nitidissima* is infrequently recorded but occasionally abundant and may be a potential habitat indicator.

Pyramidellidae (Specimens 10 and 15). The draft TDP suggests species identifications for pyramidellids without separation of juveniles, as currently done at APEM. There were five

discrepancies for Specimen 10 and eight for Specimen 14, all within Pyramidellidae in both cases. Problems have been noted for other species in the family in previous ring tests. Pyramidellidae is one of the largest gastropod families in northern European waters and identification is difficult. Many species are rare or poorly known and there are several newly described species in the area, as well as potential new national records. There have also been several generic, and even family level (see above) reassignments. As ectoparasites on other invertebrates (usually found unattached), they have potential as indicator species. Further discussion is required for suitable policies, preferably with additional training.

Retusidae (Specimens 02, 11 and 13). The draft TDP suggests species identifications for retusids without separation of juveniles, as currently done at APEM. Only *Retusa umbilicata* generated discrepancies (4). The specimen was subadult and this species has caused problems in previous circulations. Species level identifications can be recommended, with audits. *Retusa* spp. can be common and the sometimes confused *Cylichna alba* is rare and restricted to deeper water.

Philinidae (Specimens 09 and 21). The draft TDP flags Philinidae for further work, due to different taxonomic levels currently used for different taxa by different labs, including variation in the recognition of juvenile sizes. APEM currently identify *Philine quadripartita* at species level and leave others at genus level (unless monospecific). One circulated specimen (09: *Philine denticulata*) was small and (consistently) with a damaged shell, matching typical finds in samples; it generated one of the largest numbers of discrepancies (15). The other (21: *Philine quadripartita*) also generated many errors (10) but most of these were effectively nomenclatural: *P. aperta* is the name in Thompson (1988). Current (requiring update) APEM policy broadly follows the suggestion in Thompson (1988) that most required dissection for identification. Philinid identification has been improved by Ohnheiser & Malaquias (2013) and their key (focussed on Scandinavia) allows identification without dissection for many spp. They also described new species and left some potential new spp. un-named; this, together with the need for revision of southern species, suggests further changes to come. Several species previously in *Philine* have since been moved to other genera. Ohnheiser & Malaquias (2013) described *P. indistincta* as indistinguishable from *P. scabra* without dissection; fortunately, these two have been moved to *Hermania*, which can now be used to distinguish them at genus level. Less fortunately, several *Philine* have been moved to *Laona*, including *P. quadrata*, which was keyed as requiring dissection for separation from *P. punctata* and other similar spp. They could potentially be separated by sculpture differences but without absolute certainty, or certain taxa could be distinguished at family rather than genus level. More discussion will be needed to establish policies for this family.

Akeridae (Specimen 24). The draft TDP suggests species identifications for the single UK akerid without separation of juveniles, as currently done at APEM. The circulated specimen had many discrepancies (7, all at family level). Although the specimens were of a reasonable size and condition, the species would have been unfamiliar to many labs due to its sporadic occurrence in samples. With experience and reference collection audits, it should be identifiable.

Acknowledgements

We are grateful to Matthew Curtis and Paul McIlwaine (CEFAS) for supply of Specimen 3.

References

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Ring Test Specimen Return Instructions

Please return all ring test specimens by 31st August 2022. 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**