NMBAQC

NE Atlantic Marine Biological Analytical Quality Control Scheme

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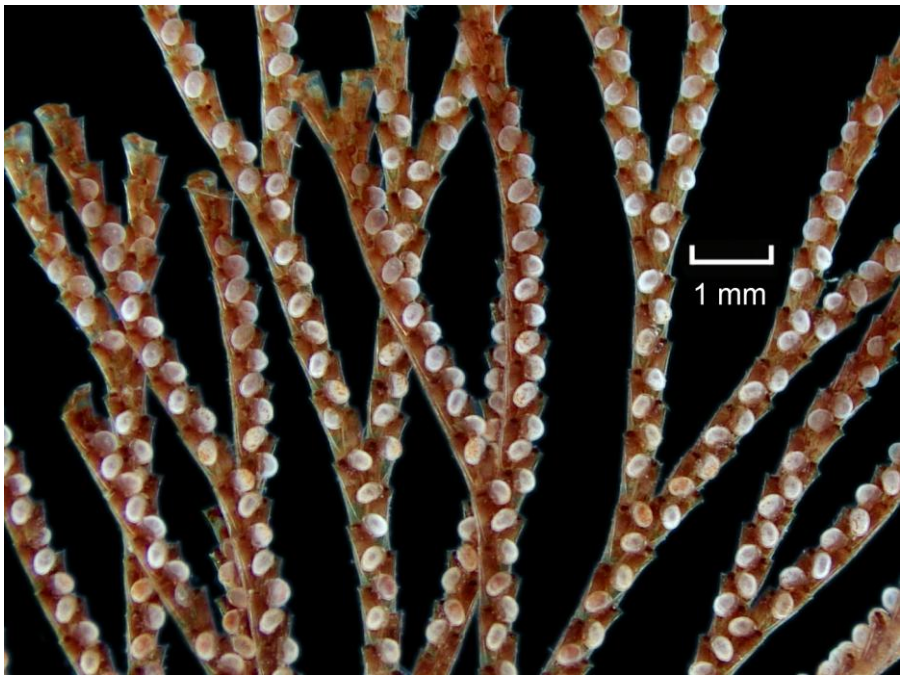
Ring Test Bulletin –
RTB#70: target – sessile fauna



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July 2026
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Ring Test 70 Details

Ring Test #70 (Year 32)
Type/Contents – Target/Sessile fauna
Circulated – 20/02/26
Results deadline – 17/04/26
Number of Subscribing Laboratories – 20
Number of Participating Laboratories – 15*
Number of Results Received – 16**
* Labs 05, 07, 18, 19 and 20 submitted no results;
** multiple data entries per laboratory permitted.

Ring Test Specimen Return Instructions

Please return all ring test specimens by 31st July 2026. 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., Unit 3, The Orbital Centre,
Icknield Way, Letchworth Garden City, Hertfordshire SG6 1ET, UK

Introduction to Ring Test 70

RT70 was targeted on sessile fauna, defined as animals permanently attached to hard substrata. There was once a tendency to ignore sessile animals from macrobiota sample analysis (which was called 'infaunal' analysis) but the choice of taxa to ignore was never consistent. Non-countable taxa are often recorded as 'present', rather than counted but this has also been inconsistent (such as for barnacles). Some of the included species were selected to highlight inconsistencies in the definition of sessile and their enumeration and other recording policies. For example, fanworms (sabellid polychaetes) and mussels (mytilid bivalves) can move once detached and separated from their settled location but would be permanently attached if undisturbed. Also, sessile animals are mobile as larvae.

The aims of the Ring Test (RT) exercises are to examine consistency of species identifications, to highlight identification problems and literature updates and to familiarise participants with species that they may not have previously encountered (Worsfold & Hall, 2017). The results are not used to assess the performance of a laboratory. Since RT68, there has been an option for participants to identify the theme for targeted ring tests, which will not be revealed before the interim report.

Species are selected to improve our understanding of the fauna. This may be through inclusion of species not previously sent: RT70 included fifteen species never previously sent, as well as one that had been previously sent under a different name. Species not yet photographed according to current protocols are also selected. Recently, species have also been selected to provide insights to help with the development of a taxonomic discrimination protocol, as detailed under family headings in the discussion section below. Five (20%) of the 25 specimens circulated were annelids, three (12%) were molluscs, three (12%) were arthropods and fourteen (56%) belonged to other Phyla, mainly Bryozoa, with some Chordata (Ascidiacea) and Cnidaria (Hydrozoa). The geographical scope was originally British waters. It is now expanded to include northern Europe and specimens may be included from further afield if the species is known from northern Europe or likely to be found there in future.

LabCodes are abbreviated in this report to exclude the Scheme year, *e.g.* BI_3201 = 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.

Worsfold, T.M. & Hall, D.J., 2017. *Benthic Invertebrate component - Ring Test Protocol*. Report to the NMBAQC Scheme participants. 6pp, August 2017.

Summary of differences

The species circulated, size, sex and condition are listed in Table 1, with a summary of differences. Participants were encouraged to question APEM Ltd. identifications where they believed their original identifications to be correct, following circulation of interim results. The full results are given in Table 2, with data arranged with species as columns to enable quick reference to the range of answers received and in Table 3, which presents the results with laboratories as columns.

There were 40 generic level differences (10% of the 400 genus identifications received from participants) recorded in the 16 data sets received from 15 participating laboratories and 64 species level differences (16% of the 400 species identifications received from participants). The numbers of errors were low compared to previous exercises. There were 11 specific differences for annelids, 19 for arthropods, 1 for molluscs and 33 for others; numbers of generic differences per major group were 6, 16, 0 and 18, respectively.

Two of the species circulated were responsible for just over one third (34%) of participants' species level identification differences. These were the barnacle *Semibalanus balanoides* and the ascidian *Molgula socialis*. Eight of the twenty-five specimens circulated: the tubeworm (annelid) *Hydroides norvegica*, the barnacle (crustacean) *Verruca stroemia*, the mussels (bivalve molluscs) *Mytilus edulis* and *Musculus subpictus*, the hydrozoan *Amphisbetia operculata* and the bryozoans *Cellaria fistulosa*, *Bugula neritina* and *Cryptosula pallasiana* were correctly identified by all participants. Some of the differences related to literature awareness, particularly for non-native species (e.g. *Bispira polyoma*, *Watersipora subatra*). The high error rate for *Molgula socialis* was partly due to its circulation as *M. manhattensis* agg. in RT60 and widespread conflation of the two species in the literature. The *Semibalanus balanoides* was originally identified as *Balanus crenatus* by APEM (along with most participants) and the errors highlight problems with the group.

Table 1. Species circulated for RT70, with summary of differences

Specimen	Genus	Species	Condition / Size	Total differences for 16 returns	
				Genus	Species
RT7001	*Conopeum*	*seurati*	fair, small portions	4	7
RT7002	*Bispira*	*polyomma*	good, medium, tails and radioles	2	5
RT7003	*Molgula*	*socialis*	good, medium	2	9
RT7004	*Vesicularia*	*spinosa*	fair, small portions	1	1
RT7005	*Musculus*	*discors*	good, small, 2-3 mm	0	1
RT7006	*Cellaria*	*fistulosa*	good, small portions	0	0
RT7007	*Botryllus*	*schlosseri*	good, medium portions	2	2
RT7008	*Watersipora*	*subatra*	good, medium portions	1	4
RT7009	*Semibalanus*	*balanoides*	good, medium, elongated bases	13	13
RT7010	*Lafoea*	*dumosa*	fair, small portions, at least one branch	3	3
RT7011	*Sabellaria*	*spinulosa*	good, medium	0	1
RT7012	*Mytilus*	*edulis*	good, small, 5-8 mm	0	0
RT7013	*Cryptosula*	*pallasiana*	fair, small portions	0	0
RT7014	*Bugulina*	*fulva*	good, small portions	0	2
RT7015	*Sabella*	*pavonina*	good, medium, tails and radioles	3	4
RT7016	*Electra*	*pilosa*	good, medium portions	1	1
RT7017	*Verruca*	*stroemia*	good, small	0	0
RT7018	*Balanus*	*balanus*	fair, small, terga but not all surrounding plates	3	6
RT7019	*Hydroides*	*norvegica*	good, medium	0	0
RT7020	*Amphisbetia*	*operculata*	good, small portions, gonothecae	0	0
RT7021	*Bicellarina*	*alderi*	good, small portions	2	2
RT7022	*Alcyonidium*	*parasiticum*	good, medium portions	2	2
RT7023	*Spirobranchus*	*lamarcki*	good, small, plain opercula	1	1
RT7024	*Musculus*	*subpictus*	good, small, 2-3 mm	0	0
RT7025	*Bugula*	*neritina*	good, small portions	0	0
			Total differences	**40**	**64**
			Average differences /lab.	**2.5**	**4.0**

Table 2. The identification of fauna made by participating laboratories for RT70 (arranged by specimen). Names are given only where different from the AQC identification.

	RT7001	RT7002	RT7003	RT7004	RT7005	RT7006	RT7007	RT7008	RT7009	RT7010	RT7011	RT7012	RT7013
Taxon	***Conopeum seurati***	***Bispira polyomma***	***Molgula socialis***	***Vesicularia spinosa***	***Musculus discors***	***Cellaria fistulosa***	***Botryllus schlosseri***	***Watersipora subatra***	***Semibalanus balanoides***	***Lafoea dumosa***	***Sabellaria spinulosa***	***Mytilus edulis***	***Cryptosula pallasiana***
BI_3201	*Cryptosula pallasiana*	- -	*- manhattensis*	- -	*- niger*	- -	- -	*- subtorquata*	*Balanus crenatus*	*Ptychogena crocea*	- -	- -	- -
BI_3202	- -	- -	*- complanata*	- -	- -	- -	- -	- -	*Balanus crenatus*	- -	- -	- -	- -
BI_3203	- -	- -	- -	- -	- -	- -	*Botrylloides diegensis*	- -	*Balanus crenatus*	*Zygophylax pinnata*	- -	- -	- -
BI_3204	*Einhornia crustulenta*	*Sabella pavonina*	*- oculata*	- -	- -	- -	*Alcyonidium hirsutum*	*Smittina landsborovii*	*Balanus crenatus*	*Filicrisia geniculata*	- -	- -	- -
BI_3206	*Einhornia crustulenta*	*- volutacornis*	*Polycarpa fibrosa*	- -	- -	- -	- -	- -	*Balanus crenatus*	- -	- -	- -	- -
BI_3208	*Einhornia crustulenta*	*- volutacornis*	*- manhattensis*	- -	- -	- -	- -	- -	*Balanus crenatus*	- -	- -	- -	- -
BI_3209	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3210	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3211	- -	- -	*- [manhattensis]*	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3212	- -	- -	*- [manhattensis agg.]*	- -	- -	- -	- -	- -	*Balanus crenatus*	- -	- -	- -	- -
BI_3213	*- reticulum*	*Sabella spallanzanii*	*- [manhattensis]*	- -	- -	- -	- -	- -	*Balanus crenatus*	- -	- -	- -	- -
BI_3214a	*- reticulum*	- -	*- occulta*	- -	- -	- -	- -	*- subtorquata*	*Balanus crenatus*	- -	- -	- -	*- [palliasiana]*
BI_3214b	*- reticulum*	- -	*- oculata*	- -	- -	- -	- -	- -	*Balanus crenatus*	- -	- -	- -	- -
BI_3215	- -	- -	*- manhattensis*	- -	- -	- -	- -	- -	*Balanus crenatus*	- -	- -	- -	- -
BI_3216	- -	- -	- -	- -	- -	- -	- -	- -	*Balanus crenatus*	- -	- -	- -	- -
BI_3217	- -	*- volutacornis*	*Eugyrioides arenosus*	*Obelia longissima*	- -	- -	- -	*- subtorquata*	*Chirona hameri*	- -	*- alveolata*	- -	- -

Table 2 (cont.). The identification of fauna made by participating laboratories for RT70 (arranged by specimen). Names are given only where different from the AQC identification.

	RT7014	RT7015	RT7016	RT7017	RT7018	RT7019	RT7020	RT7021	RT7022	RT7023	RT7024	RT7025
Taxon	*Bugulina fulva*	*Sabella pavonina*	*Electra pilosa*	*Verruca stroemia*	*Balanus balanus*	*Hydroides norvegica*	*Amphisbetia operculata*	*Bicellarina alderi*	*Alcyonidium parasiticum*	*Spirobranchus lamarcki*	*Musculus subpictus*	*Bugula neritina*
BI_3201	- -	*Potamilla neglecta*	- -	- -	*- crenatus*	- -	- -	- -	- -	- -	- -	- -
BI_3202	- -	*Bispira volutacornis*	- -	- -	*Perforatus perforatus*	- -	- -	- -	- -	- -	- -	- -
BI_3203	*- flabellata*	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3204	- -	*Parasabella cambrensis*	- -	- -	*Austrominius modestus*	- -	- -	*Tricellaria ternata*	*Vesicularia spinosa*	*Placostegus tridentatus*	- -	- -
BI_3206	- -	- -	- -	- -	*Austrominius modestus*	- -	- -	- -	*Turbicellepora avicularis*	- -	- -	- -
BI_3208	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3209	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3210	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3211	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3212	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3213	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3214a	- -	- -	- -	- -	*- crenatus*	- -	- -	- -	- -	- -	- -	- -
BI_3214b	*- avicularia*	- -	- -	- -	*- crenatus*	*[Hydoides] -*	- -	*Bicellariella ciliata*	- -	- -	- -	- -
BI_3215	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3216	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3217	- -	*- discifera*	*Caberea ellisii*	- -	- -	- -	- -	- -	- -	- -	- -	- -

Specimen Images and Breakdown of Identifications

Basic differences are given below. More detail may be available in the later 'taxonomic and Identification policy considerations' section. The abbreviation "SD" refers to the Species Directory (Howson & Picton, 1997).

(Figure codes: A=anterior; P=posterior; L=lateral; D=dorsal; V=ventral). The codes in brackets following the species names below the figures are sample identification codes to allow tracking of sources of specimens.

RT7001 – *Conopeum seurati* (Canu, 1928) (Figures 1a, 1b)

Substratum: Diamicton. Salinity: Reduced (Mesohaline). Depth: Infralittoral. Geography: western Ireland. Condition: Fair. Size: Small portions. All specimens from one sample.

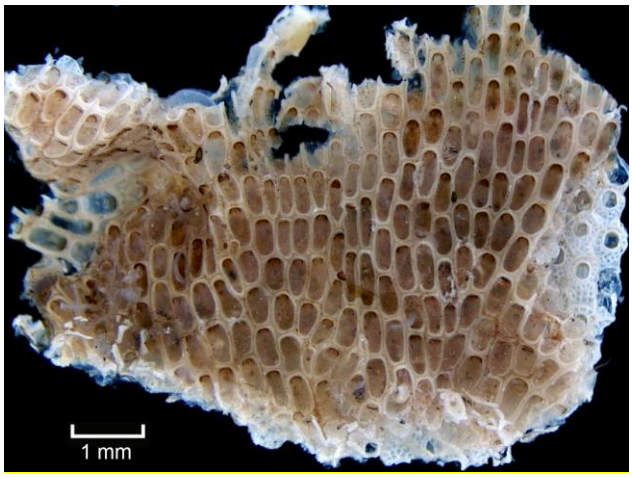


Fig. 1a. *Conopeum seurati* (RT7001; 12254, Rincarna 2.1) – colony portion

Four generic and seven specific differences: Labs 13, 14a and 14b identified as *Conopeum reticulum* (Figure 1c) (which has thicker calcification and paired kenozooids at the distal end of most autozooids); Labs 04, 06 and 08 identified as *Einhornia crustulenta* (Figure 1d) (which has a wider gymnocyst, with a low median proximal spine); Lab 01 identified as *Cryptosula pallasiana* (Figures 13a, 13b, though identification assumed to have been for a smaller included colony) (which has extensive calcification).

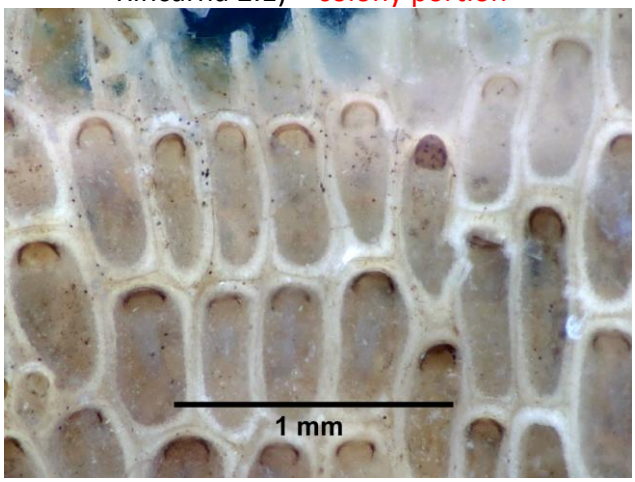


Fig. 1b. *Conopeum seurati* (RT7001; 12254, Rincarna 2.1) – zooids

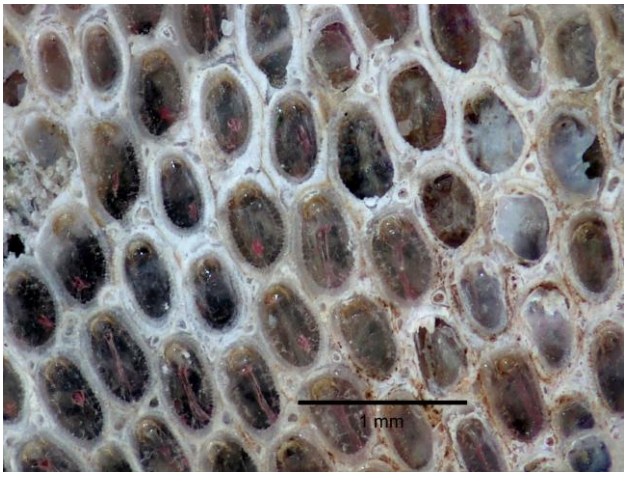


Fig. 1c. *Conopeum reticulum* (413154, 40714) – zooids

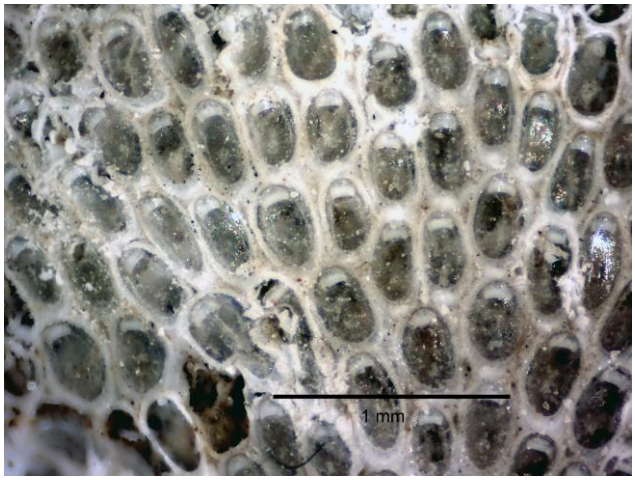


Fig. 1d. *Einhornia crustulenta* (RT6025; 4354.3, 66530) – zooids

RT7002 – *Bispira polyomma* Giangrande & Faasse, 2012 (Figures 2a, 2b, 2c)

Substratum: Hard substrata. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: southwest England. Condition: Good, tails and radioles. Size: Medium. All specimens from one sample.

Fig. 2a. *Bispira polyomma* (RT7002; John Bishop, Plymouth) – D

Two generic and five specific differences: Labs 06, 08 and 17 identified as *Bispira volutacornis* (Figures c) (which has more radioles, arranged in spirals and lacking regular colour bands); Lab 04 identified as *Sabella pavonina* (Figures 15a-15c, 15h); Lab 13 identified as *Sabella spallanzanii* (no material available) (both of which lack paired compound eyes on the radioles).

Fig. 2b. *Bispira polyomma* (RT7002; John Bishop, Plymouth) – V

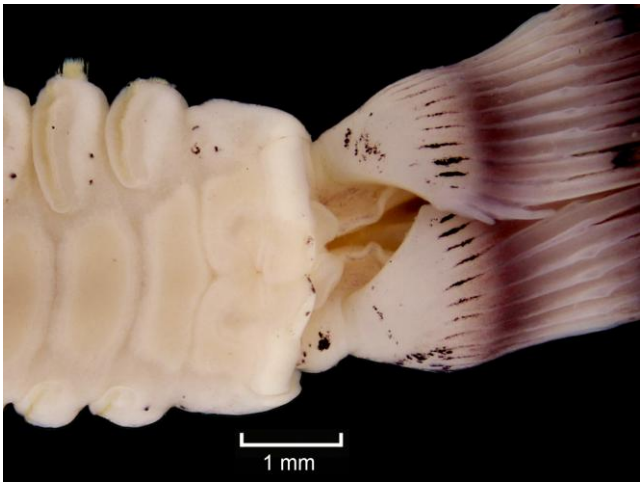


Fig. 2c. *Bispira polyomma* (RT7002; John Bishop, Plymouth) – V, anterior

Fig. 2d. *Bispira volutacornis* (413531, 54775) – D

Fig. 2e. *Bispira volutacornis* (413531, 54775) – V

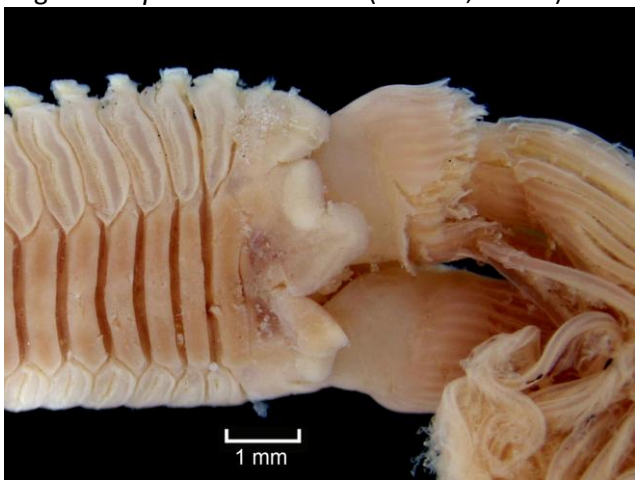


Fig. 2f. *Bispira volutacornis* (413531, 54775) – V, anterior

RT7003 – *Molgula socialis* Alder, 1863 (Figures 3a, 3f, 3g, 3m, 3q)

Substratum: Diamicton. Salinity: Variable (Euryhaline). Depth: Circalittoral (Upper Shelf). Geography: southeast England. Condition: Good. Size: Medium. All specimens from one sample.

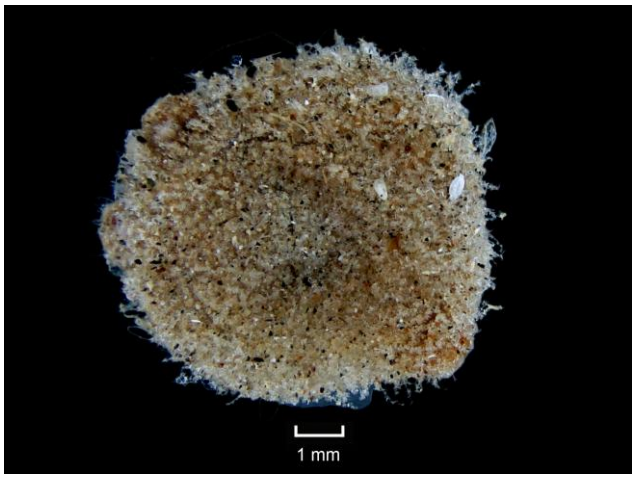


Fig. 3a. *Molgula socialis* (RT7003; 2233.2, 64210) – L

Two generic and nine specific differences: Labs 01, 08 and 15 identified as *Molgula manhattensis* (Figures 3b, 3h, 3i, 3n, 3r, 3s) (which has multiple sperm ducts per gonad); Labs 02 and 04 identified as *Molgula occulta* (Figure 3j); Labs 14a and 14b identified as *Molgula complanata* (Figures 3c, 3k, 3o) (both of which have 7 branchial folds); Lab 17 identified as *Eugyrioides arenosus* (Figures 3d, 3l) (which lacks branchial folds); Lab 06 identified as *Polycarpa fibrosa* (Figures 3e, 3k, 3p) (which has multiple, scattered gonads).

Labs 11, 12 and 13 identified as *Molgula manhattensis*, with 'agg.' or a note to indicate inclusion of *M. socialis*; these have been accepted as correct for the purposes of this exercise (see below).

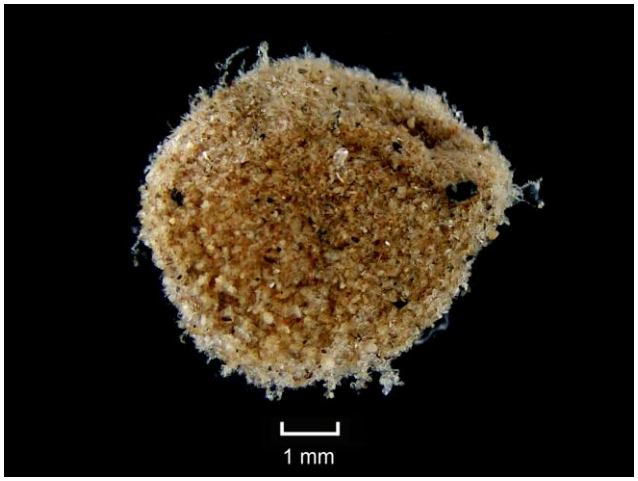


Fig. 3b. *Molgula manhattensis* (P2233.2, 64175) – L

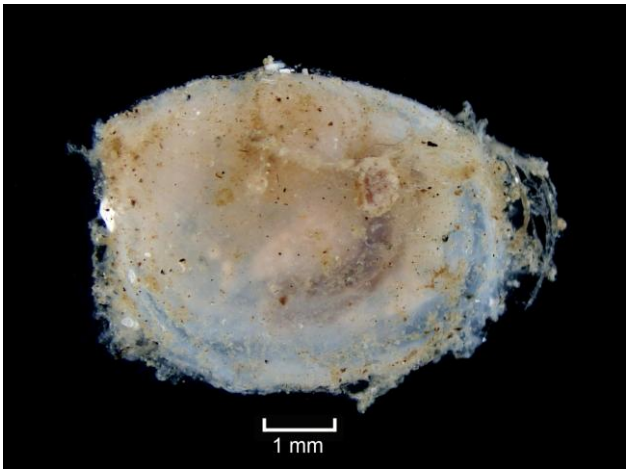


Fig. 3c. *Molgula complanata* (RT6618; 13652.01, 75357) – L

Fig. 3d. *Eugyrioides arenosus* (P1347.3, 58787) – L

Fig. 3e. *Polycarpa fibrosa* (413667, 43398) – L

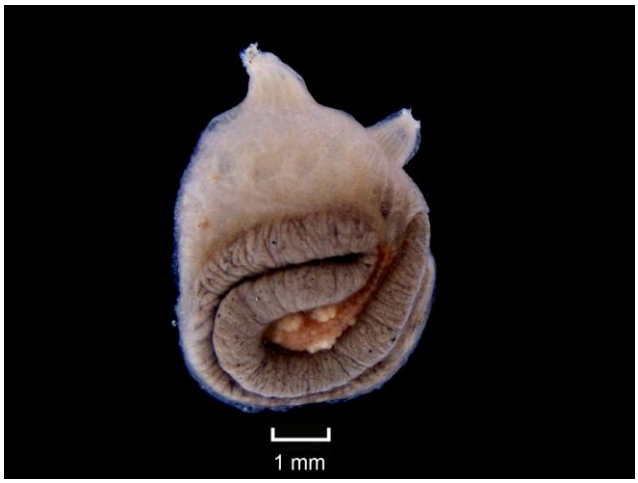


Fig. 3f. *Molgula socialis* (RT7003; 2233.2, 64210) – L(left), test removed

Fig. 3g. *Molgula socialis* (RT7003; 2233.2, 64210) – L(right), test removed

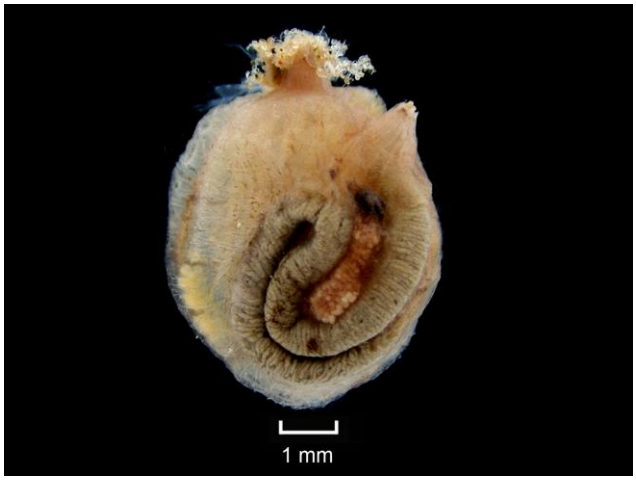


Fig. 3h. *Molgula manhattensis* (P2233.2, 64175) – L(left), test removed

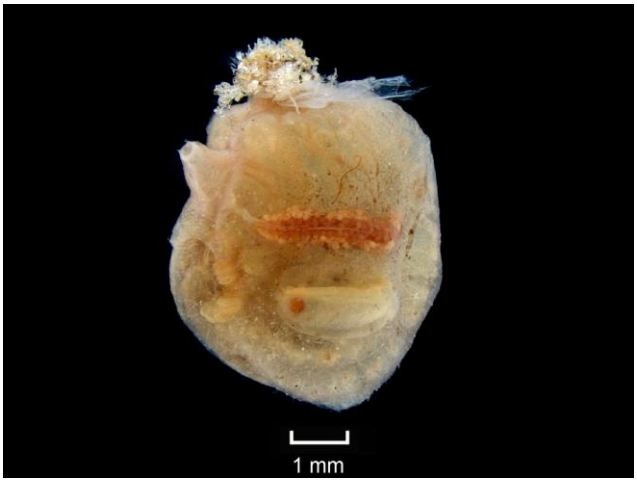


Fig. 3i. *Molgula manhattensis* (P2233.2, 64175) – L(right), test removed

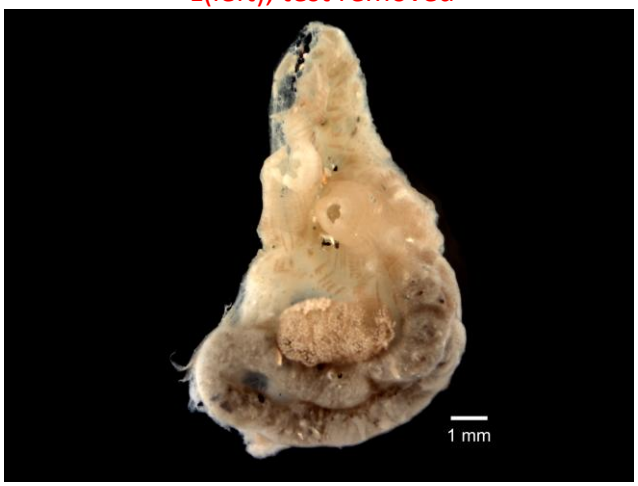


Fig. 3j. *Molgula occulta* (P1987_59320) – L(left), test removed

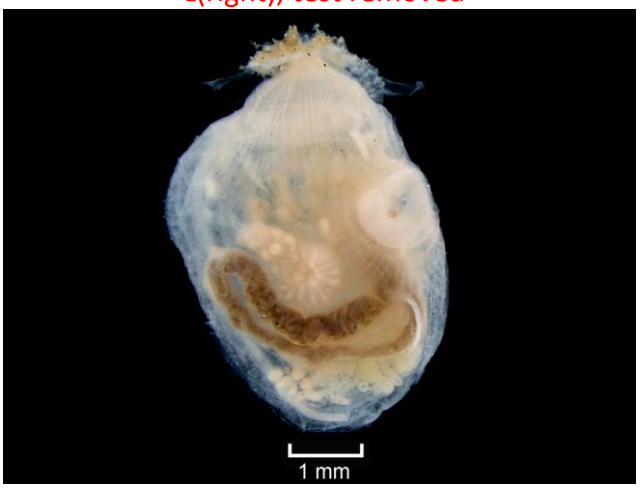


Fig. 3k. *Molgula complanata* (RT6618; 13652.01, 75357) – L(left), test removed

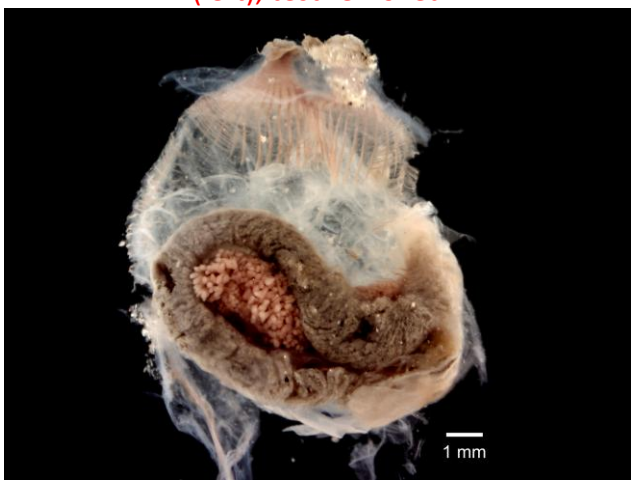


Fig. 3l. *Eugyrioides arenosus* (P1347.3, 58787) – L(left), test removed

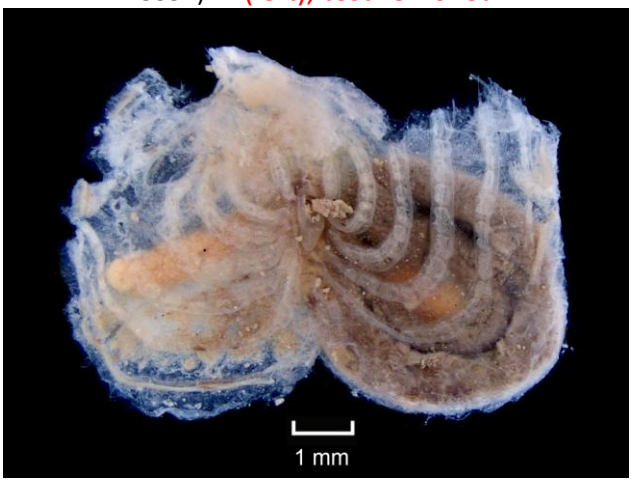


Fig. 3m. *Molgula socialis* (RT7003; 2233.2, 64210) – internal

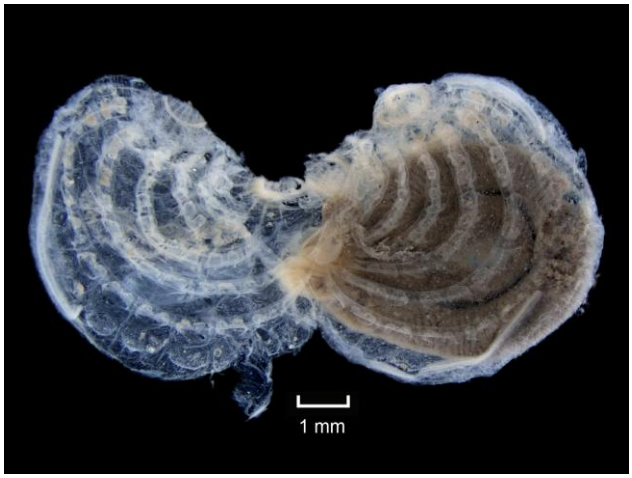


Fig. 3n. *Molgula manhattensis* (P2233.2, 64175) – internal

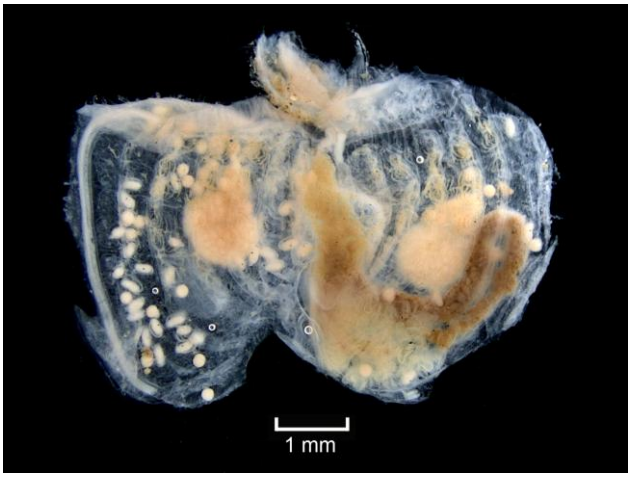


Fig. 3o. *Molgula complanata* (RT6618; 13652.01, 75357) – internal

Fig. 3p. *Polycarpa fibrosa* (413667, 43398) – internal

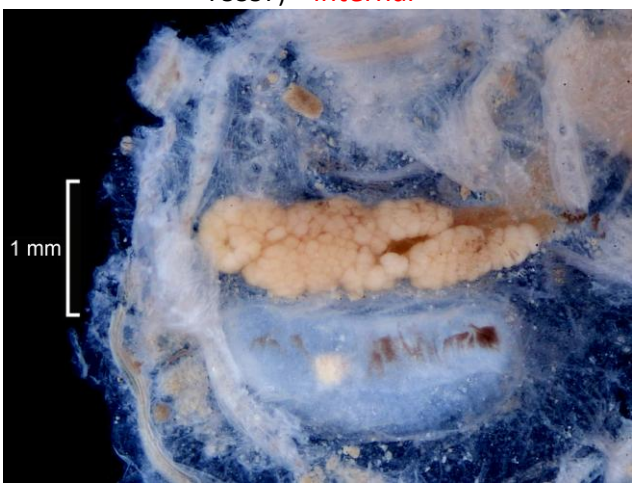


Fig. 3q. *Molgula socialis* (RT7003; 2233.2, 64210) – gonad

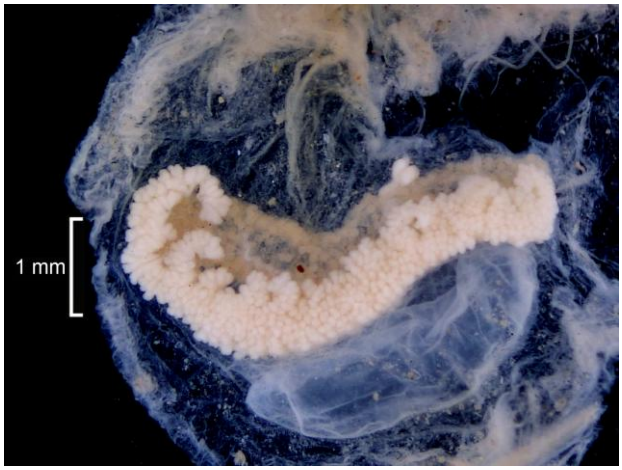


Fig. 3r. *Molgula manhattensis* (P2233.2, 64175) – gonad

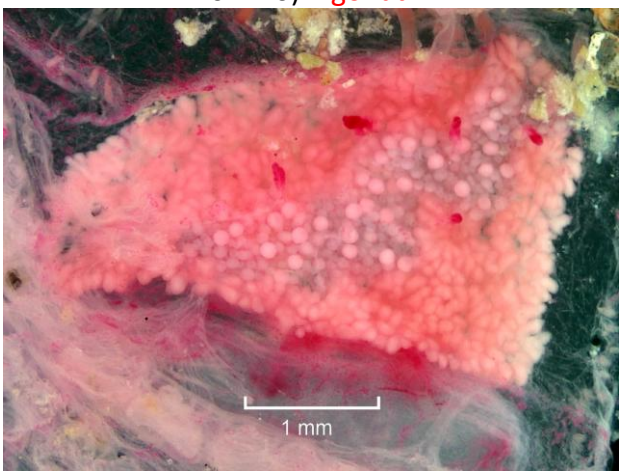


Fig. 3s. *Molgula manhattensis* (P2233.2, 64175) – gonad (stained)

RT7004 – *Vesicularia spinosa* (Linnaeus, 1758) (Figures 4a, 4b)

Substratum: Diamicton. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: North Sea. Condition: Fair. Size: Small portions. All specimens from one sample.

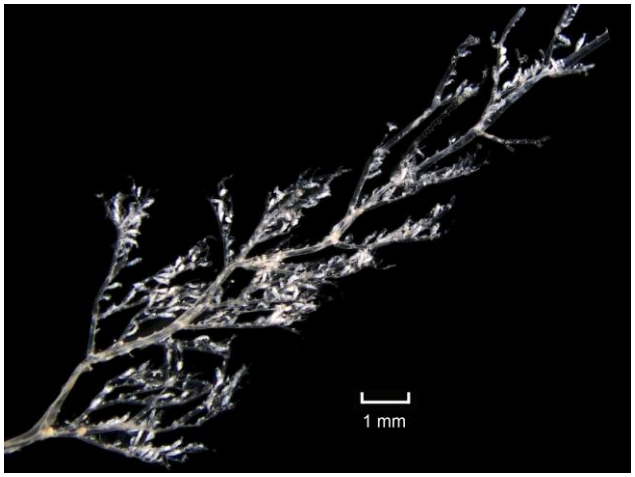


Fig. 4a. *Vesicularia spinosa* (RT7004; 12545, 75197) – colony portion

One generic and specific difference: Lab 17 identified as *Obelia longissima* (Figure 4c) (which has polyps in hydrothecae with ringed pedicels).

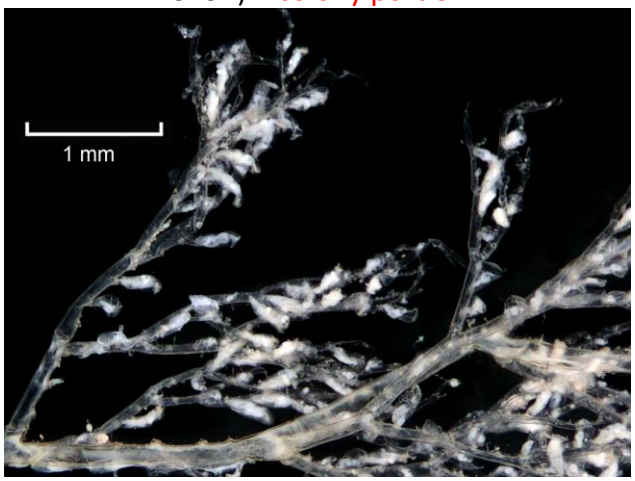


Fig. 4b. *Vesicularia spinosa* (RT7004; 12545, 75197) – zooids

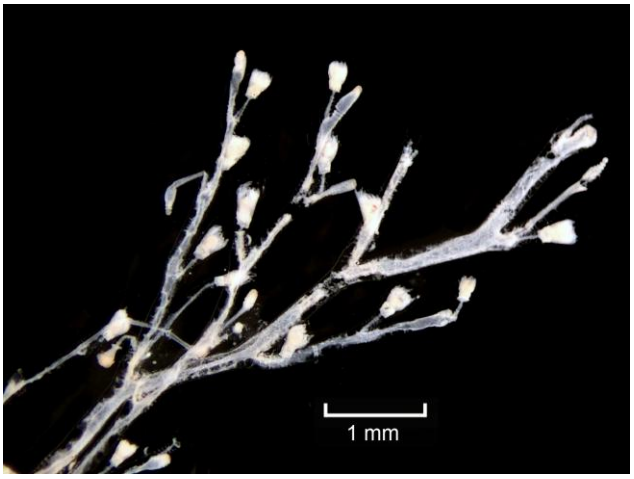


Fig. 4c. *Obelia longissima* (P10382.2, 72613) – polyps

RT7005 – *Musculus discors* (Linnaeus, 1767) (Figure 5a)

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

Fig. 5a. *Musculus discors* (RT7005; 7249, 69955) – L

One generic and specific difference: Lab 01 identified as *Musculus niger* (Figure 5b, small specimen only available) (which has 40-60 posterior ribs and 12-15 anterior ribs).

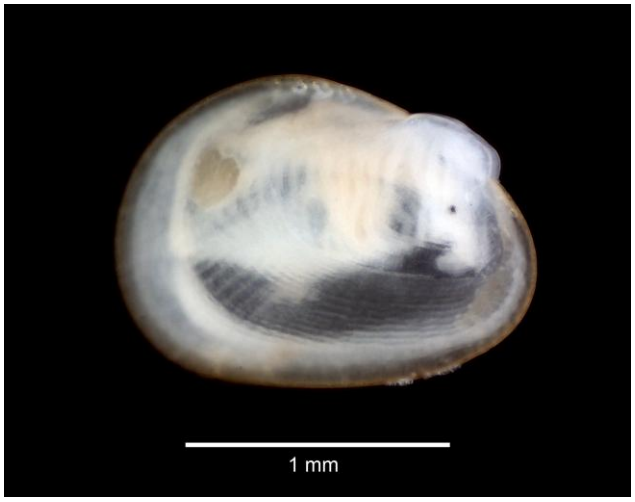
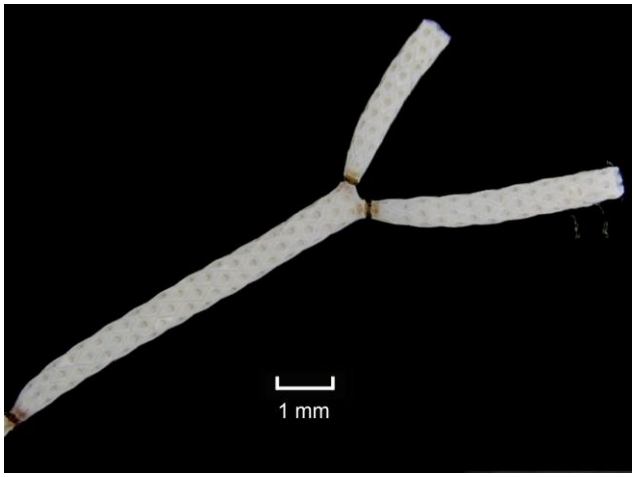


Fig. 5b. *Musculus niger* (413646, 10784) – L

RT7006 – *Cellaria fistulosa* (Linnaeus, 1758) (Figures 6a, 6b)

Substratum: Diamicton. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: southwest England. Condition: Good. Size: Small portions. All specimens from one sample.



No generic or specific differences recorded.

Fig. 6a. *Cellaria fistulosa* (RT7006; 413932, 12094) – colony portion

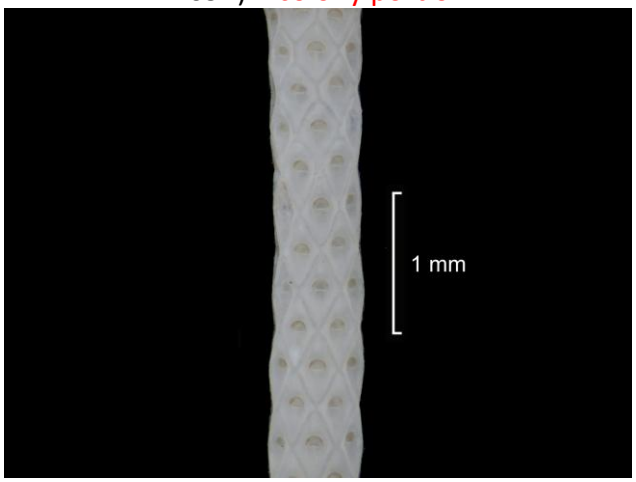


Fig. 6b. *Cellaria fistulosa* (RT7006; 413932, 12094) – zooids

RT7007 – *Botryllus schlosseri* (Pallas, 1766) (Figures 7a, 7b)

Substratum: Hard substrata. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: northern Scotland. Condition: Good. Size: Medium portions. All specimens from one sample.

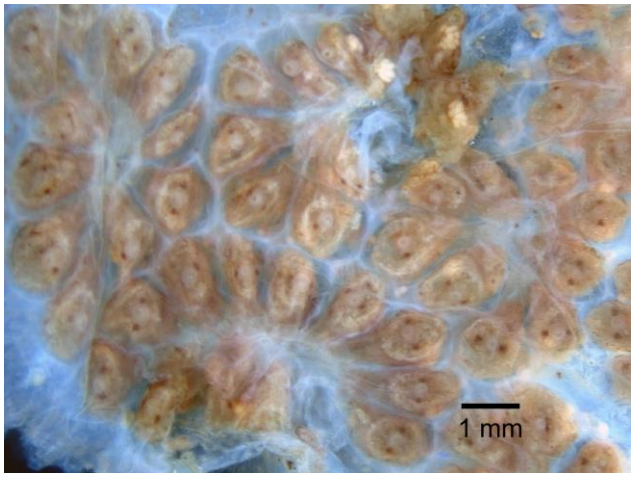


Fig. 7a. *Botryllus schlosseri* (RT7007; 13652.01, 75353) – colony portion

Two generic and specific differences: Lab 03 identified as *Botrylloides diegensis* (Figures 7c, 7d) (which has shorter exhalent siphons, not directed within rings of zooids); Lab 04 identified as *Alcyonidium hirsutum* (Figure 7e) (which has small autozooids with associated conical kenozooids).

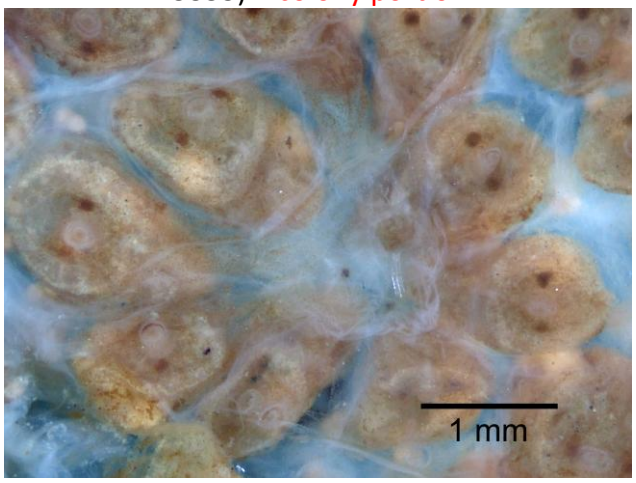


Fig. 7b. *Botryllus schlosseri* (RT7007; 13652.01, 75353) – zooids

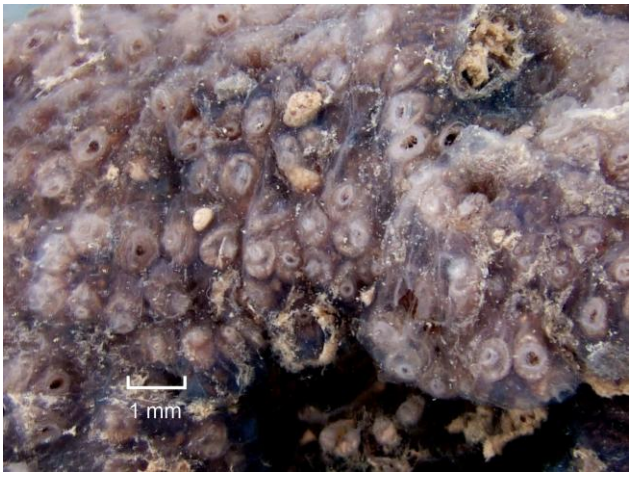


Fig. 7c. *Botrylloides diegensis* (CA, Levington) – colony portion

Fig. 7d. *Botrylloides diegensis* (CA, Levington) – zooids

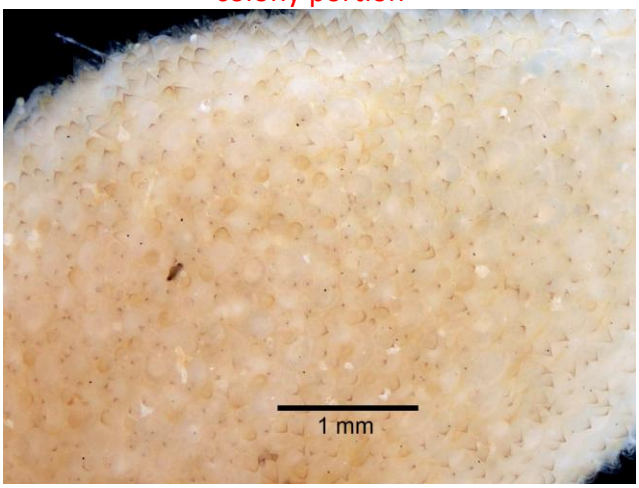


Fig. 7e. *Alcyonidium hirsutum* (P2188.1, 61573) – colony portion

RT7008 – *Watersipora subatra* (Ortmann, 1890) (Figures 8a, 8b)

Substratum: Hard substrata. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: southeast England. Condition: Good. Size: Medium portions. All specimens from one sample.

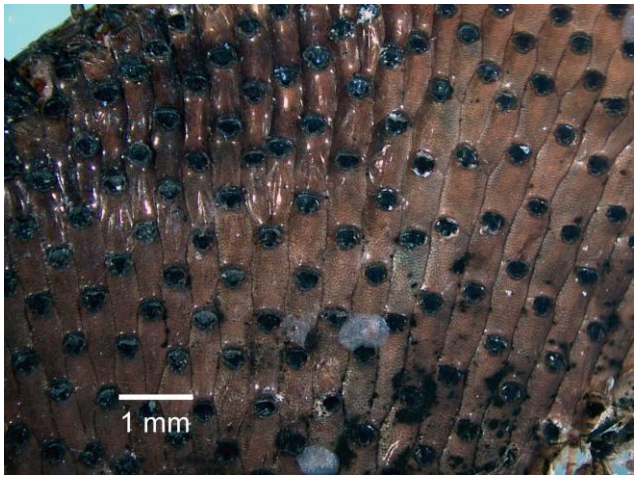


Fig. 8a. *Watersipora subatra* (RT7008; CA, Lowestoft) – colony portion

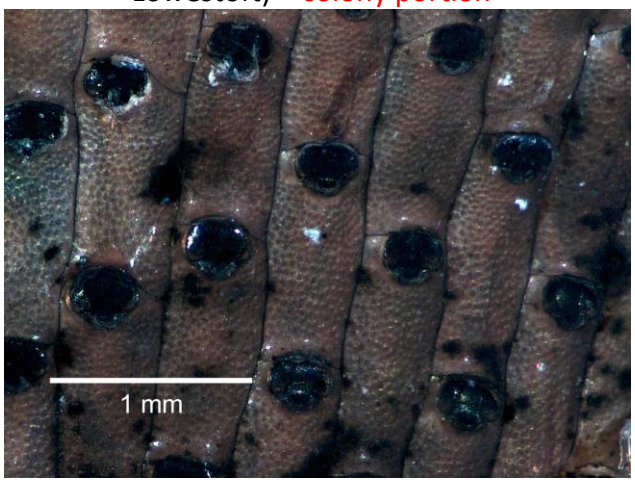


Fig. 8b. *Watersipora subatra* (RT7008; CA, Lowestoft) – zooids

Three specific differences: Labs 01, 14a and 17 identified as *Watersipora subtorquata* (no material available) (which has tooth-like condyles).

RT7009 – *Semibalanus balanoides* (Montagu, 1808) (Figures 9a, 9b, 9d, 9f)

Substratum: Hard substrata. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: northern Scotland. Condition: Good, elongated bases. Size: Medium. All specimens from one sample.

Fig. 9a. *Semibalanus balanoides* (RT7009; 16250.02, 78052) – L

Twelve generic and specific differences: Labs 01, 02, 03, 06, 08, 12, 13, 14a, 14b, 15 and 16 identified as *Balanus crenatus* (Figures 9c, 9e, 9g) (which has spinules on the 3rd cirrus and a basal penile spine); Lab 17 identified as *Chirona hameri* (Figure 9h) (which has more strongly projecting shell plates).

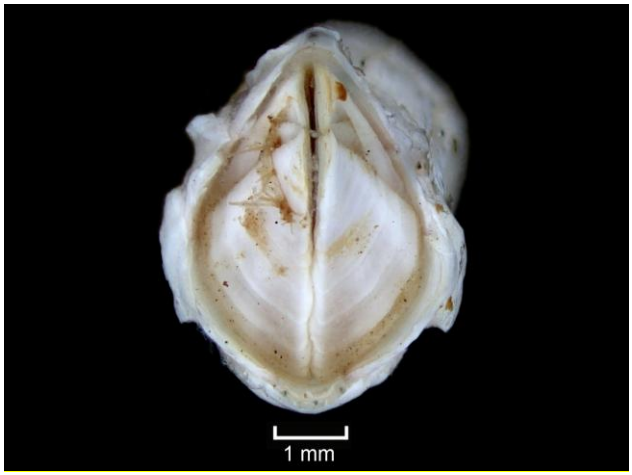


Fig. 9b. *Semibalanus balanoides* (RT7009; 16250.02, 78052) – D

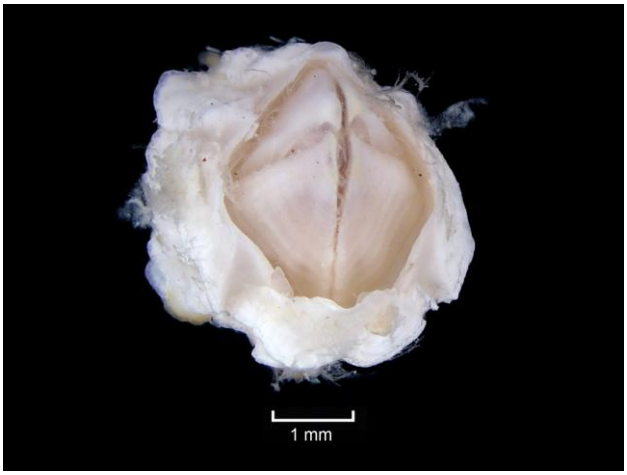


Fig. 9c. *Balanus crenatus* (P529, 58015) – D

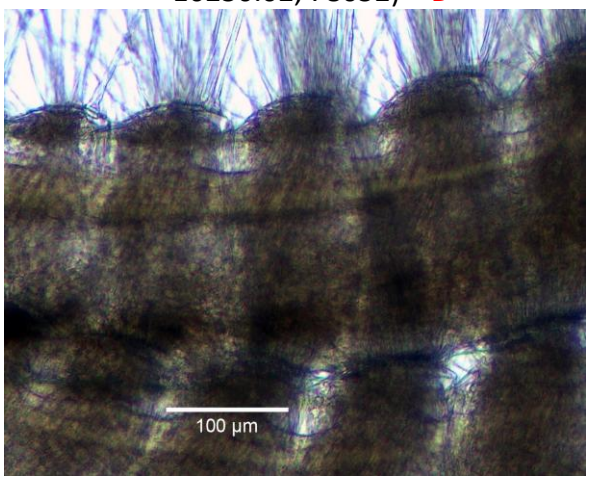


Fig. 9d. *Semibalanus balanoides* (RT7009; 16250.02, 78052) – 3rd cirrus

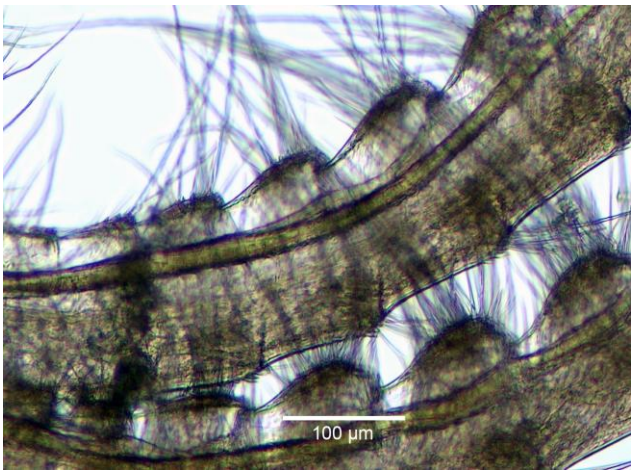


Fig. 9e. *Balanus crenatus* (P529, 58015) – 3rd cirrus

Fig. 9f. *Semibalanus balanoides* (RT7009; 16250.02, 78052) – penis

Fig. 9g. *Balanus crenatus* (P529, 58015) – penis

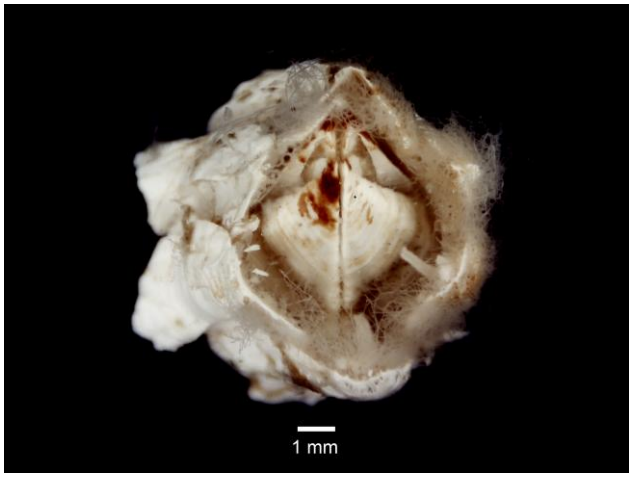


Fig. 9h. *Chirona hameri* (P2188.1, 61883) – D

RT7010 – *Lafoea dumosa* (Fleming, 1820) (Figures 10a, 10b)

Substratum: Diamicton. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: North Sea. Condition: Good, at least one branch. Size: Small portions. Sex: Female. Specimens from four samples.

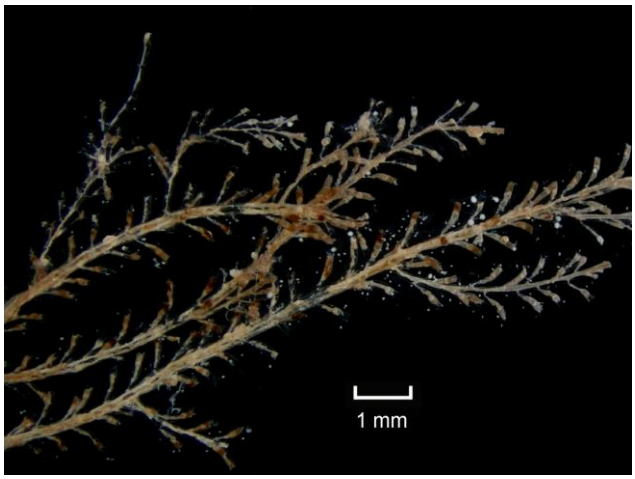


Fig. 10a. *Lafoea dumosa* (RT7010; 9903, 74541) – colony portion

Two generic and specific differences: Lab 01 identified as *Ptychogena crocea*, senior synonym of *Stegopoma plicatile*, (Figures 10c, 10d) (which has operculate hydrothecae); Lab 03 identified as *Zygophylax pinnata* (Figures 10e, 10f) (which has more distinctly pedicellate hydrothecae).

Fig. 10b. *Lafoea dumosa* (RT7010; 9903, 74541) – polyps

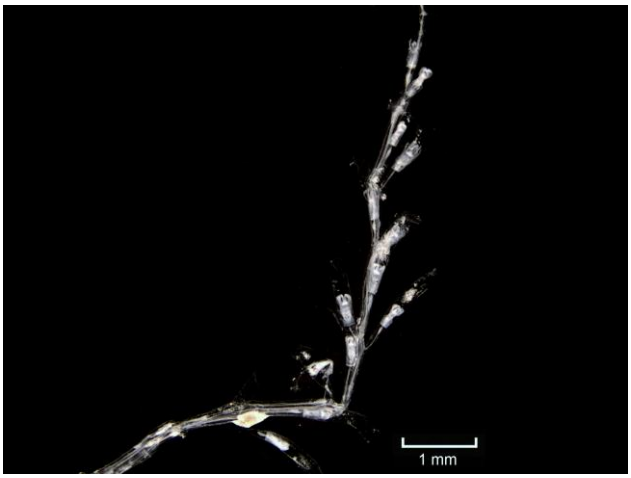


Fig. 10c. *Ptychogena crocea* (414210, 56001) – colony portion

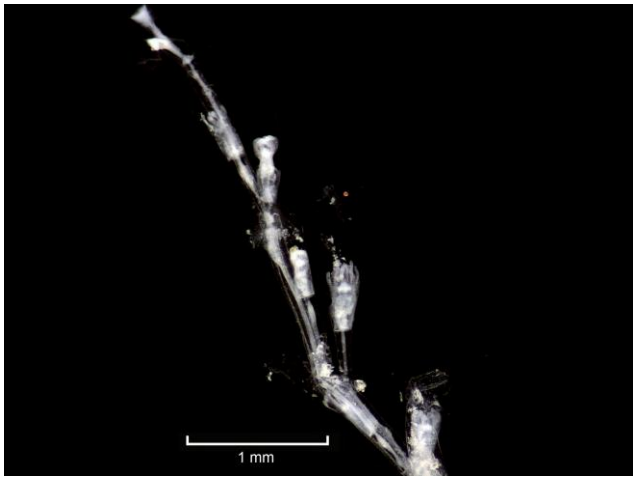


Fig. 10d. *Ptychogena crocea* (414210, 56001) – polyps

Fig. 10e. *Zygophylax pinnata* (P3183, 62438) – colony portion

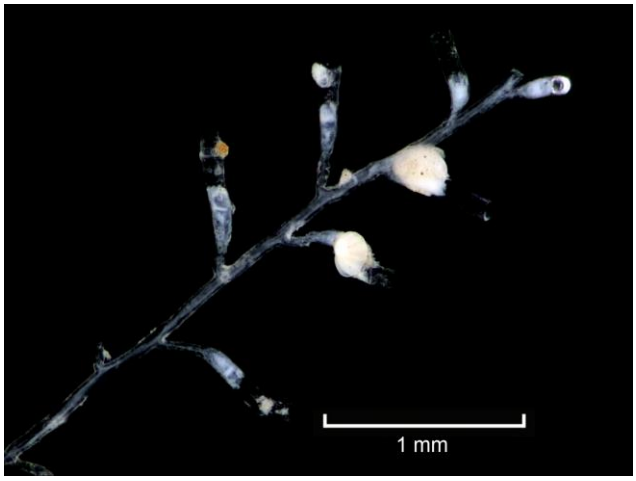


Fig. 10f. *Zygophylax pinnata* (P3183, 62438) – polyps

RT7011 – *Sabellaria spinulosa* (Leuckart, 1849) (Figures 11a, 11c, 11e)

Substratum: Hard substrata. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: southeast England. Condition: Good. Size: Medium. All specimens from one sample.

Fig. 11a. *Sabellaria spinulosa* (RT7011; 414024, 54858) – D

One specific difference: Lab 17 identified as *Sabellaria alveolata* (Figures 11b, 11d, 11f) (which has less pointed mid row opercular chaetae).

Fig. 11b. *Sabellaria alveolata* (P9317, 74341) – D

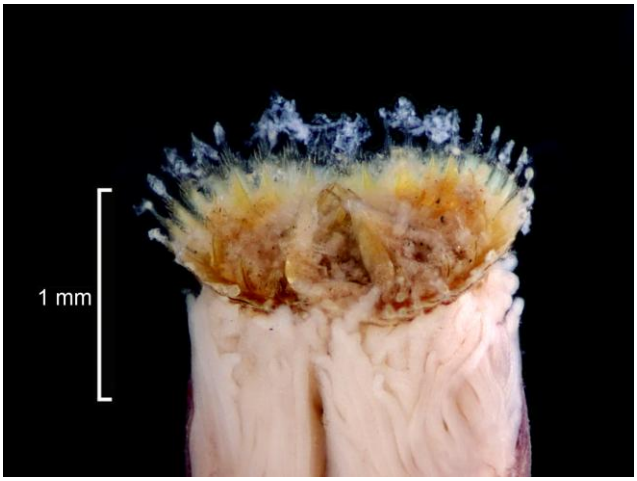


Fig. 11c. *Sabellaria spinulosa* (RT7011; 414024, 54858) – D, crown

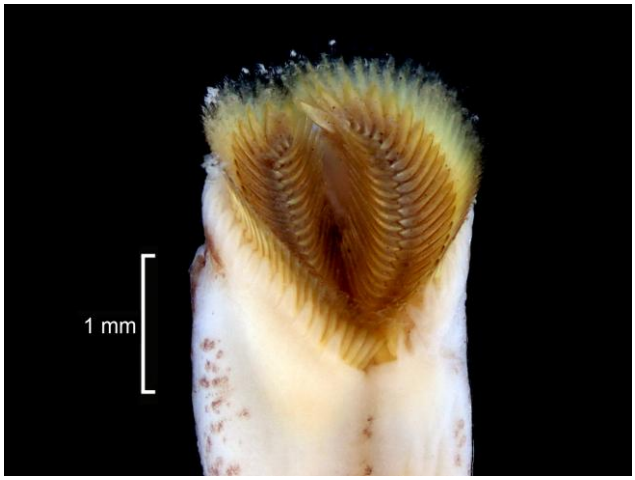


Fig. 11d. *Sabellaria alveolata* (P9317, 74341) – D, crown

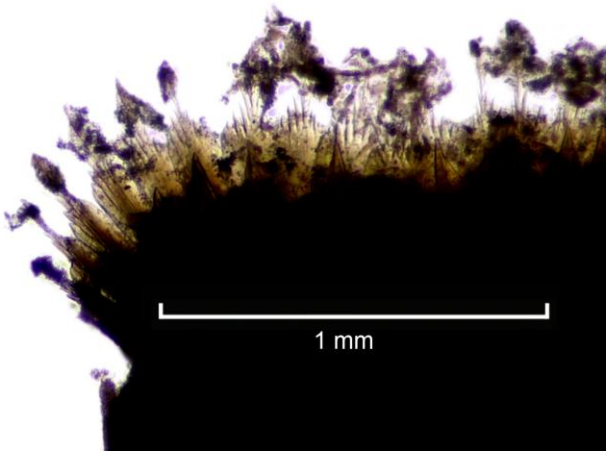


Fig. 11e. *Sabellaria spinulosa* (RT7011; 414024, 54858) – opercular chaetae

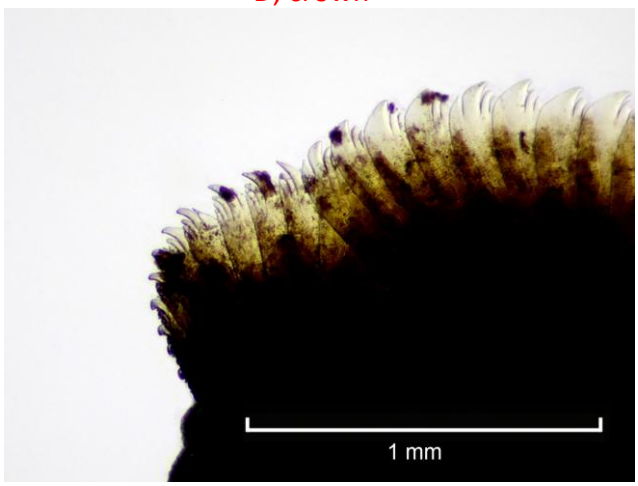


Fig. 11f. *Sabellaria alveolata* (P9317, 74341) – opercular chaetae

RT7012 – *Mytilus edulis* Linnaeus, 1758 (Figure 12a)

Substratum: Hard substrata. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: northern Scotland. Condition: Good. Size: Small, 5-8 mm. All specimens from one sample.

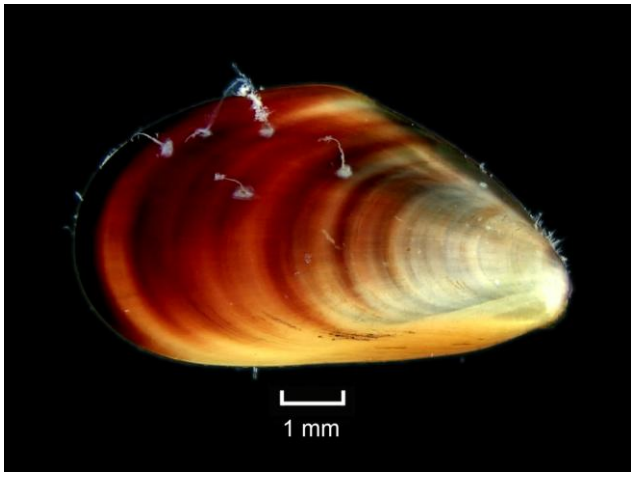


Fig. 12a. *Mytilus edulis* (RT7012; 18547.02, 80058) – L

No generic or specific differences recorded.

Lab 03 noted that *M. edulis* is not reliably indistinguishable from *M. trossulus*, morphologically; lab 09 noted hybridisation between *Mytilus* spp. and lab 12 suggested 'agg.' or genus protocol.

RT7013 – *Cryptosula pallasiana* (Moll, 1803) (Figures 13a, 13b)

Substratum: Diamicton. Salinity: Reduced (Mesohaline). Depth: Infralittoral. Geography: western Ireland. Condition: Fair. Size: Small portions. All specimens from one sample.

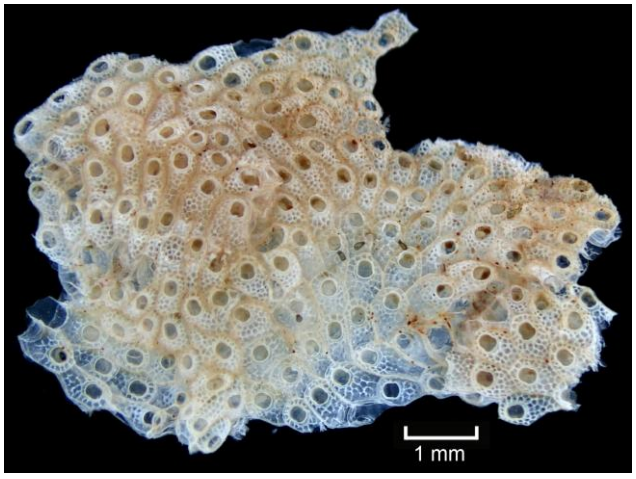


Fig. 13a. *Cryptosula pallasiana* (RT7013; 12254, Rincarna 2.1) – colony portion

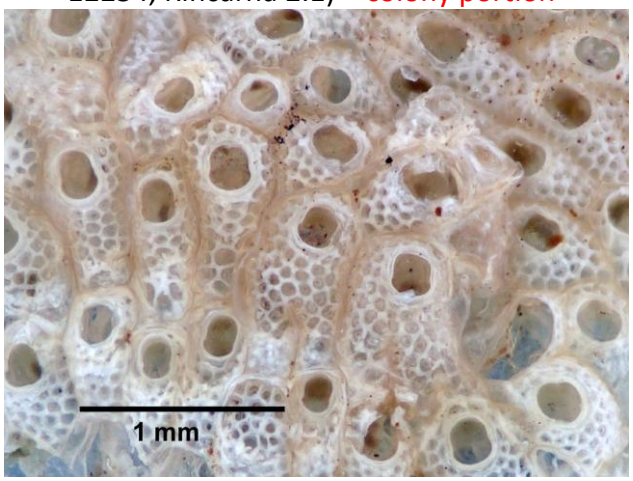


Fig. 13b. *Cryptosula pallasiana* (RT7013; 12254, Rincarna 2.1) – zooids

No generic or specific differences recorded.

RT7014 – *Bugulina fulva* (Ryland, 1960) (Figures 14a, 14b)

Substratum: Floral turf. Salinity: Salinity: Full (Euhaline). Depth: Infralittoral. Geography: western Ireland. Condition: Good. Size: Small portions. All specimens from one sample.

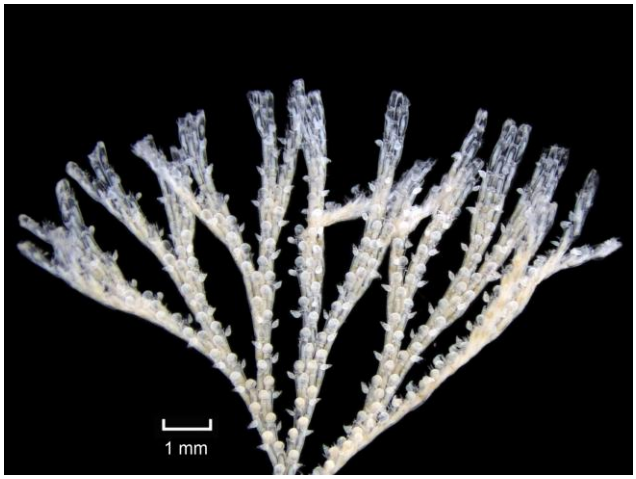


Fig. 14a. *Bugulina fulva* (RT7014; 10597.01, 77723) – colony portion

Two specific differences: Lab 03 identified as *Bugulina flabellata* (Figures 14c, 14d) (which has rectangularly hooked avicularia beaks); Lab 14b identified as *Bugulina avicularia* (Figures 14e, 14f) (which has only two spines on the outer distal angle of the autozooids, one on the inner angle).

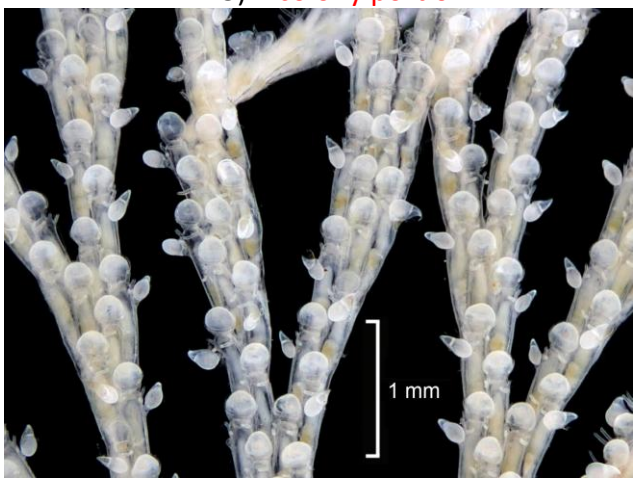


Fig. 14b. *Bugulina fulva* (RT7014; 10597.01, 77723) – zooids

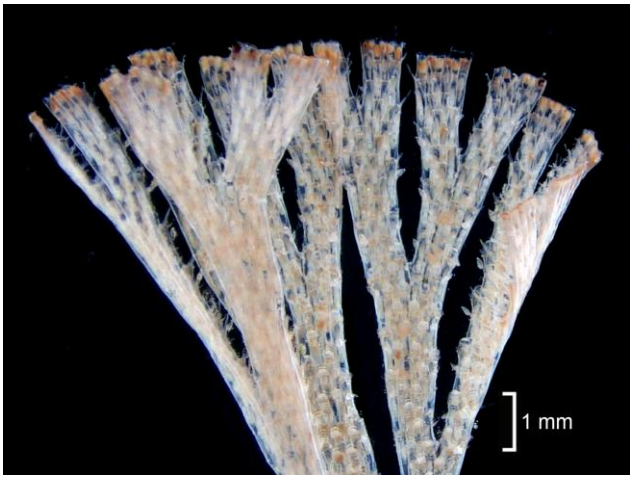


Fig. 14c. *Bugulina flabellata* (P17780, 78952) – colony portion

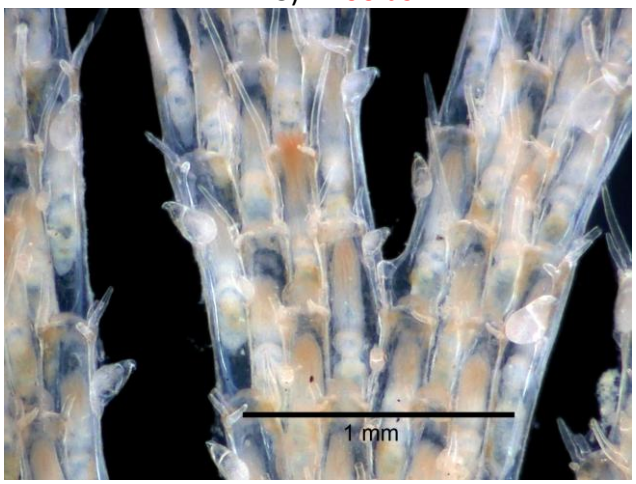


Fig. 14d. *Bugulina flabellata* (P17780, 78952) – zooids

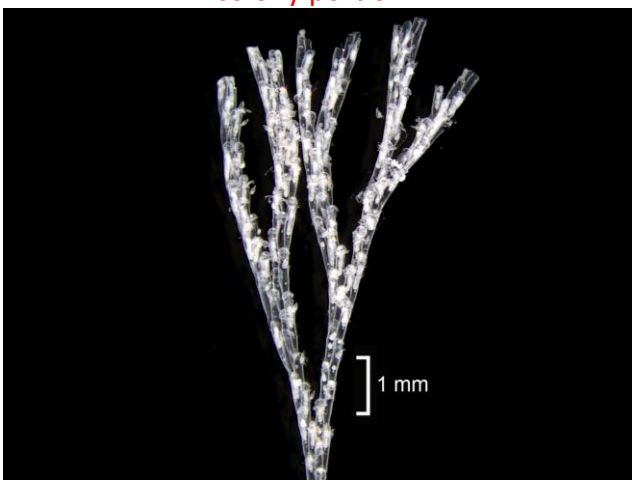


Fig. 14e. *Bugulina avicularia* (P13245, 75859) – colony portion

Fig. 14f. *Bugulina avicularia* (P13245, 75859) – zooids

RT7015 – *Sabella pavonina* Savigny, 1822 (Figures 15a, 15b, 15c, 15h)

Substratum: Diamicton. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: north of Ireland. Condition: Good, tails and radioles present. Size: Medium. All specimens from one sample.

Fig. 15a. *Sabella pavonina* (RT7015; 10382.1, 72587) – D

Two generic and three specific differences: Lab 17 identified as *Sabella discifera* (Figures 15d, 15e, 15f, 15i) (which has whitish subdistal swellings near the radiole tips); Lab 02 identified as *Bispira volutacornis* (Figures 2d, 2e, 2f) (which has paired compound eyes on the radioles); Lab 01 identified as *Potamilla neglecta* (no material available; Figure 15g shows *Laonome kroyeri*) (which has abdominal neurochaetae in transverse rows).

Fig. 15b. *Sabella pavonina* (RT7015; 10382.1, 72587) – V

Fig. 15c. *Sabella pavonina* (RT7015; 10382.1, 72587) – V, anterior

Fig. 15d. *Sabella discifera* (413532, 42422) – D

Fig. 15e. *Sabella discifera* (413532, 42422) – V

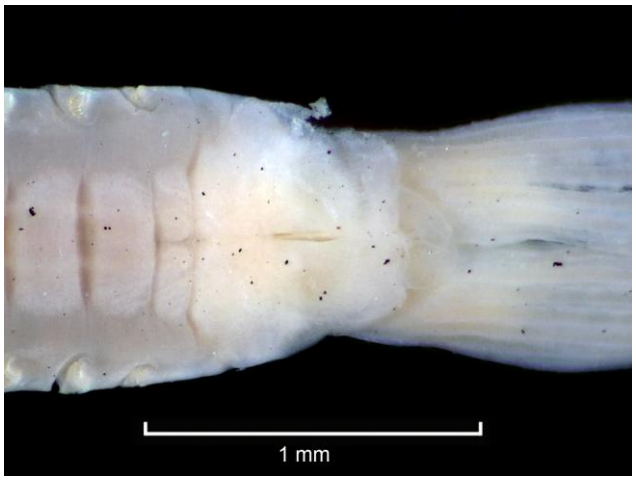


Fig. 15f. *Sabella discifera* (413532, 42422) – V, anterior

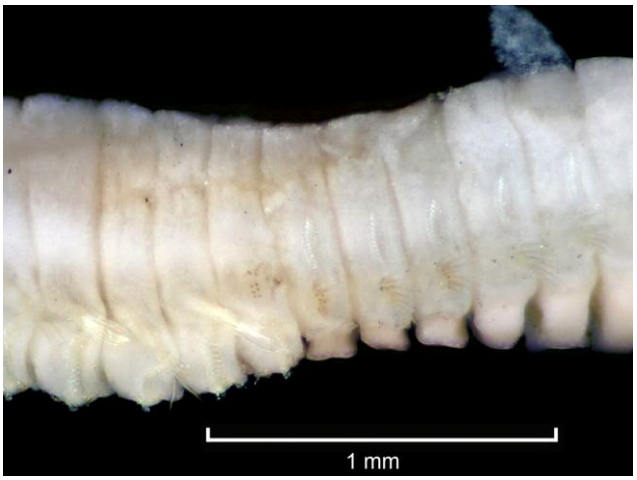


Fig. 15g. *Laonome kroyeri* (P1341.1, 58657) – D, thoracic chaetae

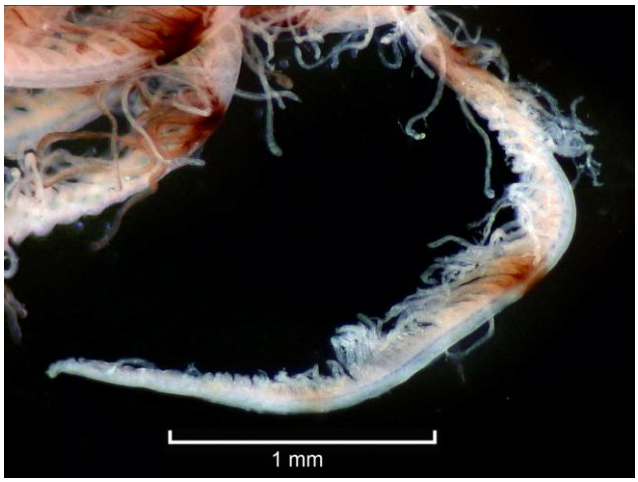


Fig. 15h. *Sabella pavonina* (RT7015; 10382.1, 72587) – radiole

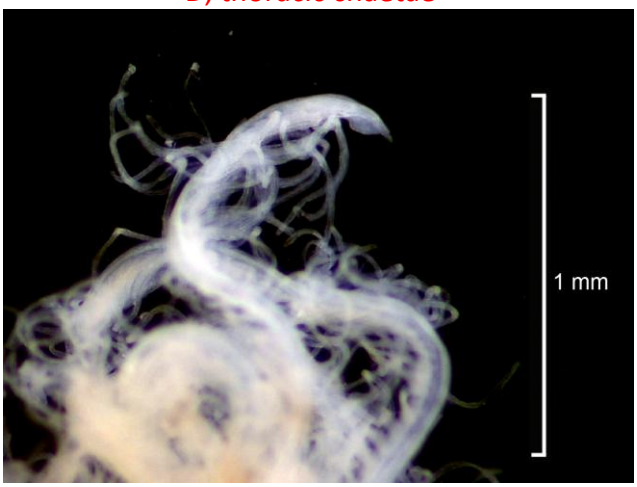


Fig. 15i. *Sabella discifera* (413532, 42422) – radiole

RT7016 – *Electra pilosa* (Linnaeus, 1761) (Figures 16a, 16b)

Substratum: Diamicton. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: North Sea. Condition: Good. Size: Medium portions. Specimens from two samples.

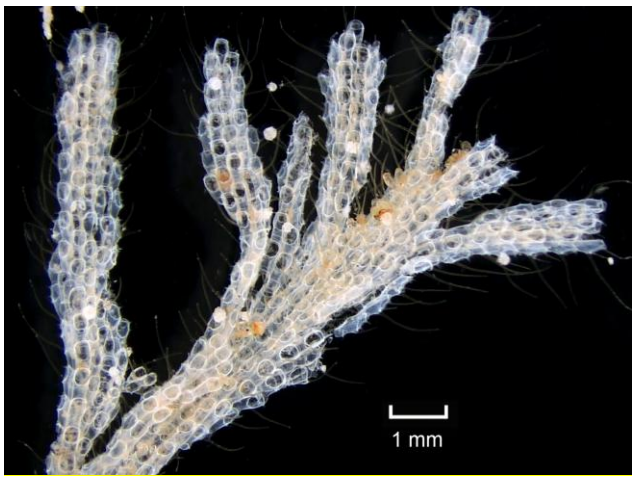


Fig. 16a. *Electra pilosa* (RT7016; 9210, 73547) – colony portion

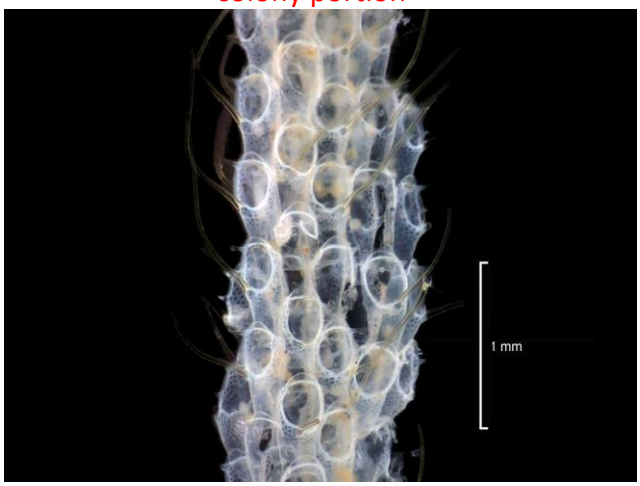


Fig. 16b. *Electra pilosa* (RT7016; 9210, 73547) – zooids

One generic and specific difference: Lab 17 identified as *Caberea ellisii* (no material available) (which has an unperforated gymnocyst).

Labs 09 and 12 noted that the taxon may be a species complex.

RT7017 – *Verruca stroemia* (O.F. Müller, 1776) (Figure 17a)

Substratum: Diamicton. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: North Sea. Condition: Good. Size: Medium. All specimens from one sample.

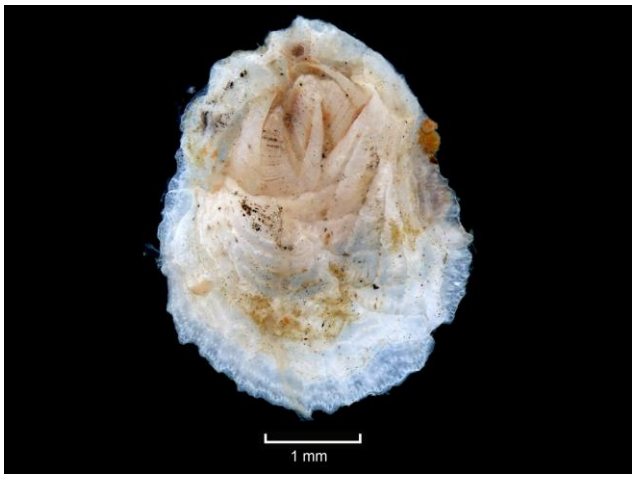


Fig. 17a. *Verruca stroemia* (RT7017; 10209, 73722) – D

No generic or specific differences recorded.

RT7018 – *Balanus balanus* (Linnaeus, 1758) (Figures 18a, 18b)

Substratum: Hard substrata. Salinity: Salinity: Full (Euhaline). Depth: Infralittoral. Geography: southeast England. Condition: Fair, terga but not all surrounding plates. Size: Small. All specimens from one sample.

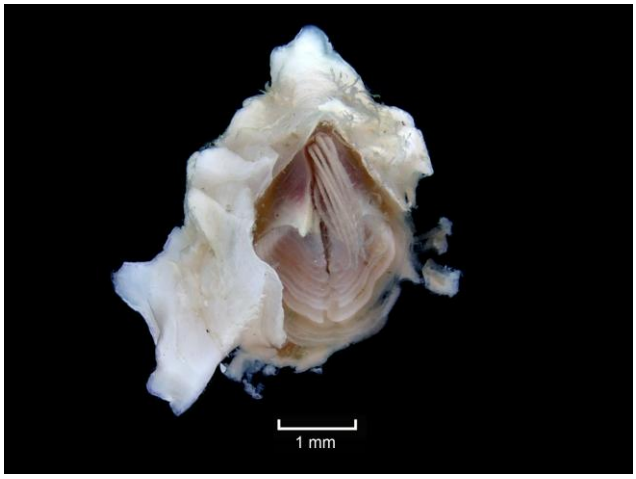


Fig. 18a. *Balanus balanus* (RT7018; 10597.01, 73256) – D

Two generic and five specific differences: Labs 01, 14a and 14a identified as *Balanus crenatus* (Figures 09c, 9e, 9g, 18c) (which has a shorter tergum); Lab 02 identified as *Perforatus perforatus* (Figure 18d) (which has a smaller opercular opening and reticulate sculpture); Lab 06 identified as *Austrominius modestus* (Figure 18e) (which has slaty grey terga that are not beaked, less pronounced).

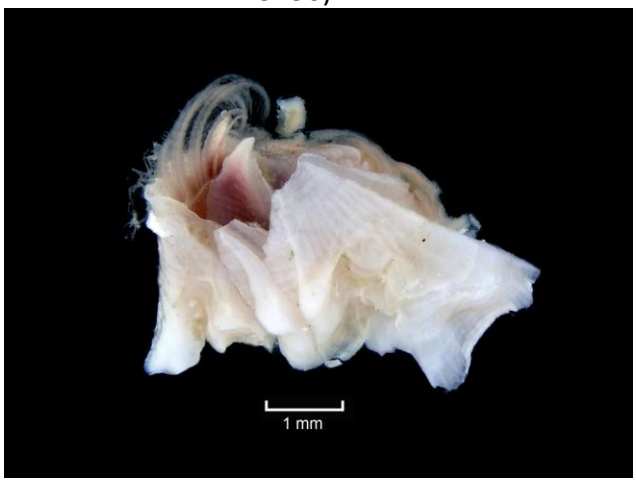


Fig. 18b. *Balanus balanus* (RT7018; 10597.01, 73256) – L

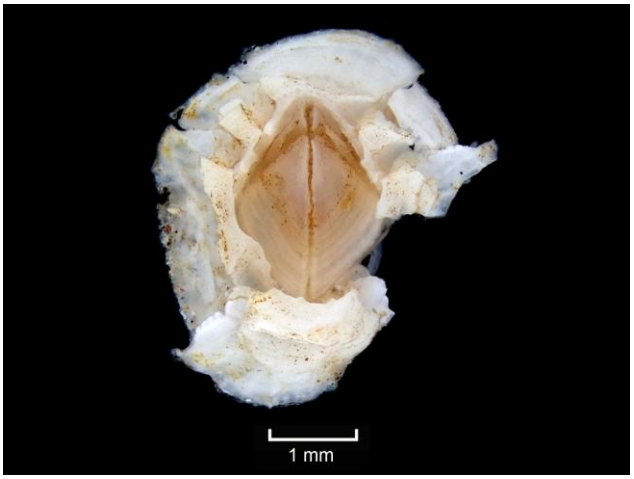


Fig. 18c. *Balanus crenatus* (4162.2, 65340) – D

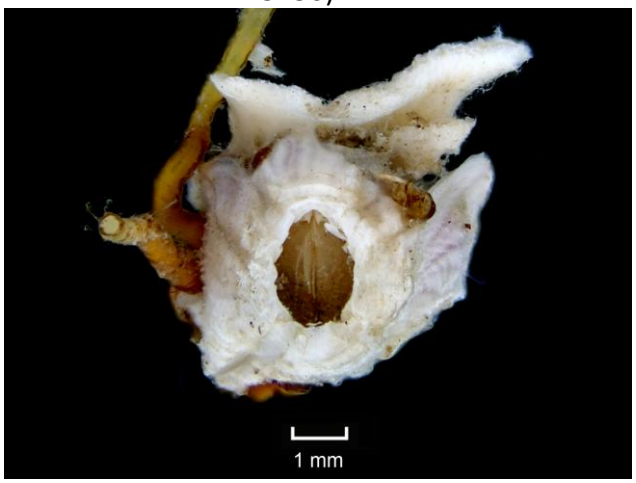


Fig. 18d. *Perforatus perforatus* (413531, 54775) – D

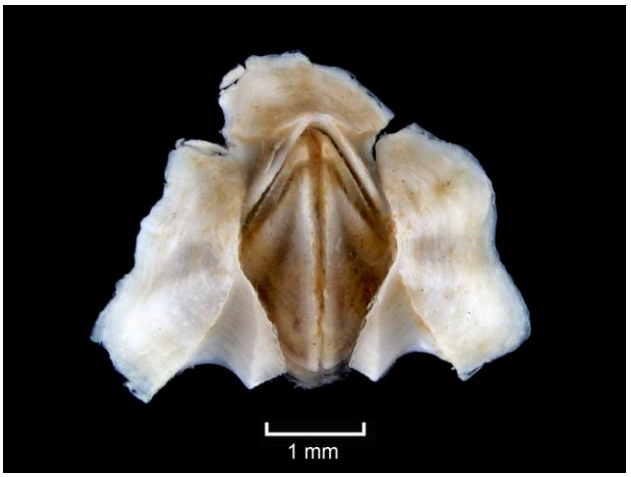


Fig. 18e. *Austrominius modestus* (P2233.1, 63640) – D

RT7019 – *Hydroides norvegica* Gunnerus, 1768 (Figure 19a)

Substratum: Diamicton. Salinity: Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: southwest England. Condition: Good. Size: Medium. Specimens from two samples.

Fig. 19a. *Hydroides norvegica* (RT7019; 414490, 57090) – L

No generic or specific differences recorded.

RT7020 – *Amphisbetia operculata* (Linnaeus, 1758) (Figures 20a, 20b)

Substratum: Hard substrata. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: northern Scotland. Condition: Good, gonothecae present. Size: Small portions. All specimens from one sample.

Fig. 20a. *Amphisbetia operculata* (RT7020; 2188.01, 61881) – colony portion

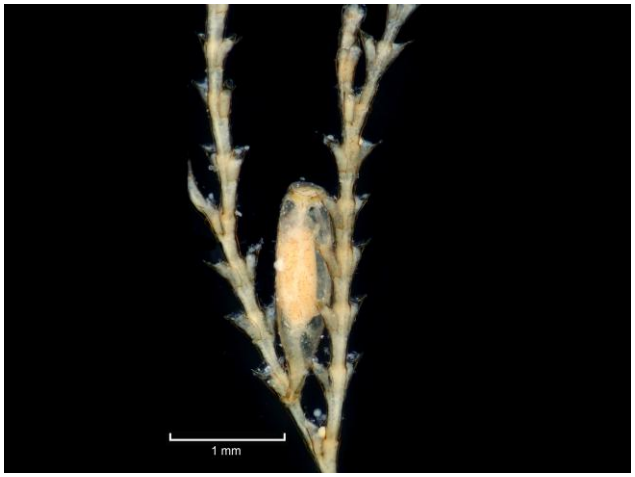


Fig. 20b. *Amphisbetia operculata* (RT7020; 2188.01, 61881) – polyps

No generic or specific differences recorded.

RT7021 – *Bicellarina alderi* Johnston, 1839 (Figures 21a, 21b)

Substratum: Diamicton. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: southeast England. Condition: Good. Size: Small portions. Specimens from four samples.

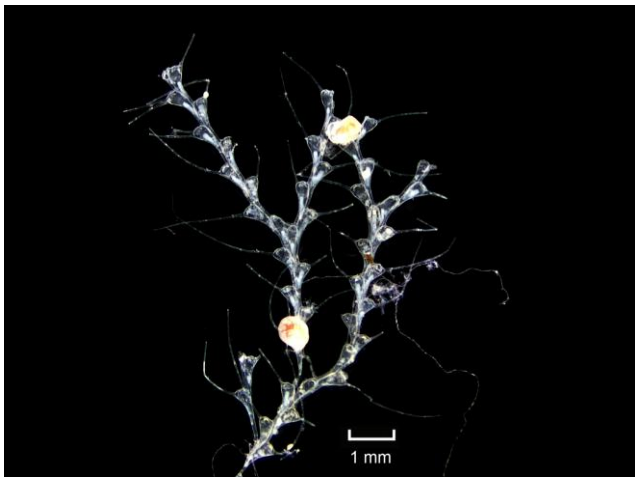


Fig. 21a. *Bicellarina alderi* (RT7021; 9115.01, 73341) – colony portion

One generic and specific difference: Lab 14b identified as *Bicellariella ciliata* (Figures 21c, 21d) (which has more than four long spines at the distal ends of the opesia).

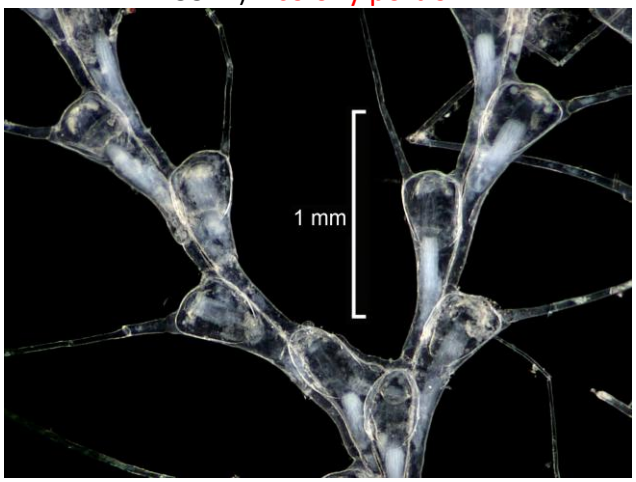


Fig. 21b. *Bicellarina alderi* (RT7021; 9115.01, 73341) – zooids

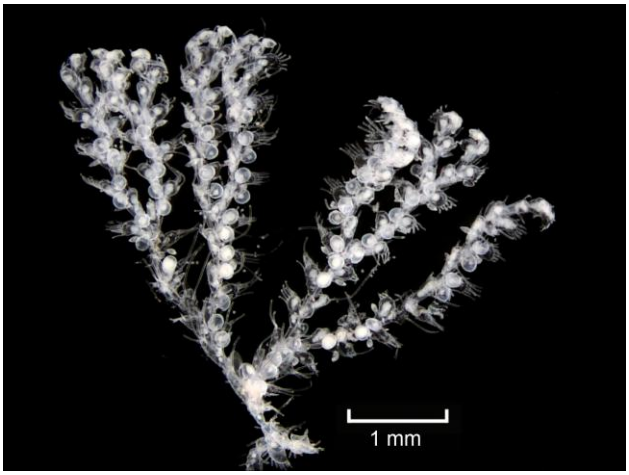


Fig. 21c. *Bicellariella ciliata* (P9317, 74443) – colony portion

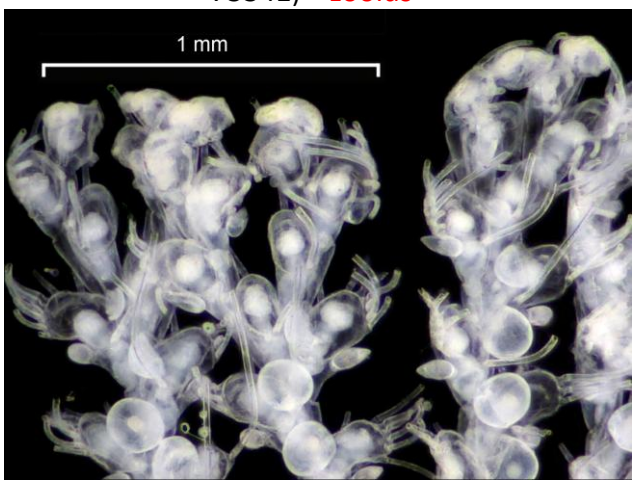


Fig. 21d. *Bicellariella ciliata* (P9317, 74443) – zooids

RT7022 – *Alcyonidium parasiticum* (Fleming, 1828) (Figures 22a, 22b)

Substratum: Diamicton. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: North Sea. Condition: Good. Size: Medium portions. All specimens from one sample.

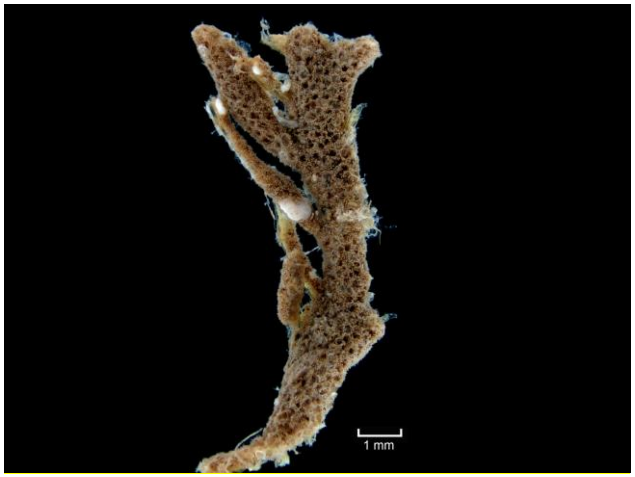


Fig. 22a. *Alcyonidium parasiticum* (RT7022; 12545, 75171) – colony portion

One generic and specific difference: Lab 06 identified as *Turbicellepora avicularis* (Figure 22c), though identification assumed to have been for a smaller included colony) (which has a calcified body wall).

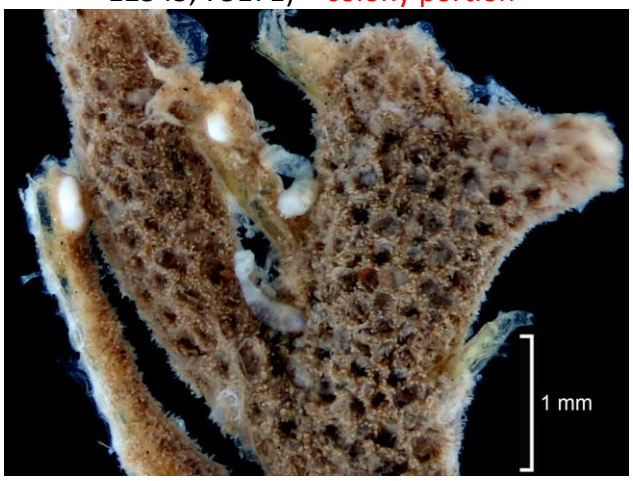


Fig. 22b. *Alcyonidium parasiticum* (RT7022; 12545, 75171) – zooids

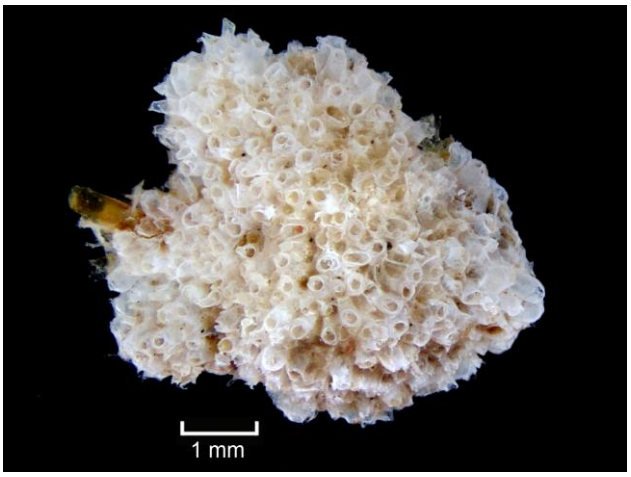


Fig. 22c. *Turbicellepora avicularis* (P3651, 63068) – colony

RT7023 – *Spirobranchus lamarcki* (Quatrefages, 1866) (Figure 23a)

Substratum: Hard substrata. Salinity: Full (Euhaline). Depth: Circalittoral (Lower Shelf). Geography: southwest England. Condition: Good, plain opercula. Size: Small. All specimens from one sample.

Fig. 23a. *Spirobranchus lamarcki* (RT7023; TW, North Cornwall) – L

No generic or specific differences recorded.

RT7024 – *Musculus subpictus* (Cantraine, 1835) (Figure 24a)

Substratum: Diamicton. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: north of Ireland. Condition: Good. Size: Small, 2-3 mm. All specimens from one sample.

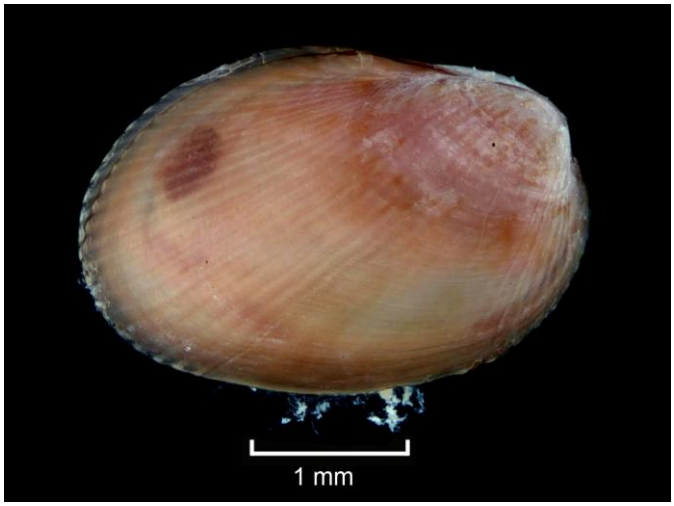


Fig. 24a. *Musculus subpictus* (RT7024; 1341.1, 58673) – L

No generic or specific differences recorded.

RT7025 – *Bugula neritina* (Linnaeus, 1758) (Figures 25a, 25b)

Substratum: Hard substrata. Salinity: Variable (Euryhaline). Depth: Infralittoral. Geography: southeast England. Condition: Good. Size: Small portions. All specimens from one sample.

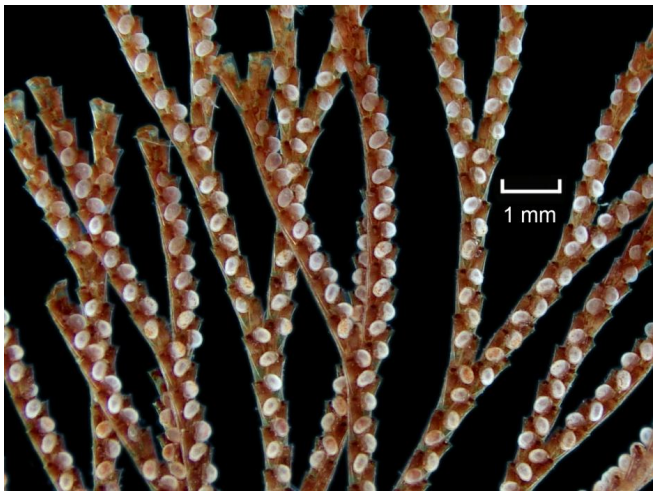


Fig. 25a. *Bugula neritina* (RT7025; CA, Shotley) – colony portion

Fig. 25b. *Bugula neritina* (RT7025; CA, Shotley) – zooids

No generic or specific differences recorded.

Lab 10 noted that the taxon may be a species complex.

Breakdown of Results by Laboratory

Differences recorded at genus and species level for each of the participating laboratories are summarised in Table 3. The laboratories are ordered by increasing number of differences at species level. An arbitrary division of laboratories into three bands (Low, Mid and High) based on the number of differences at species level is shown in Figure 26. The results are not used to assess the performance of a laboratory and the graph with categories for numbers of identification differences (Figure 26) is provided for interest only.

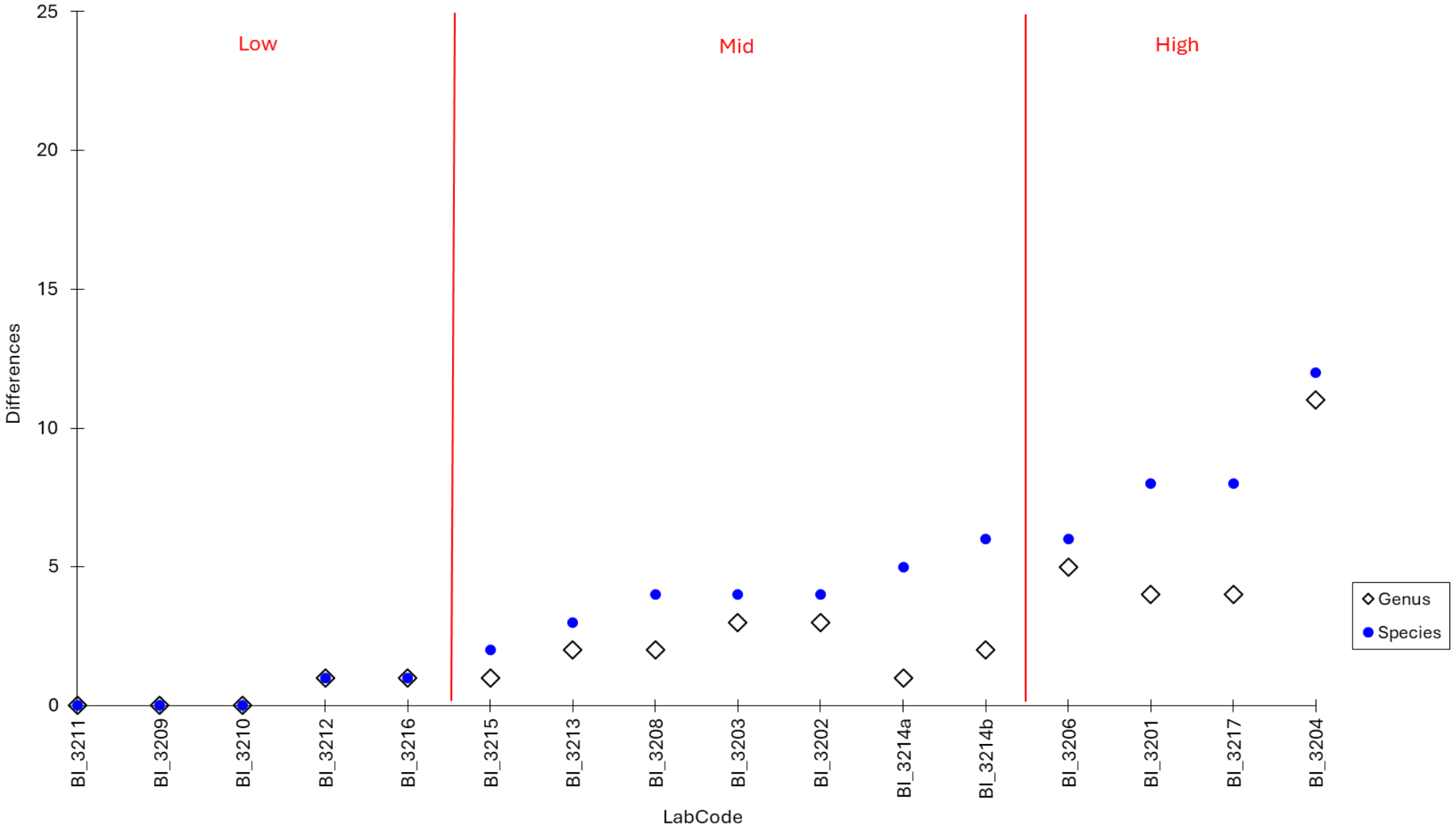
Table 3. The identification of fauna made by participating laboratories for RT70 (arranged by participant). Names are given only where different from the AQC identification.

	Taxon	BI_3201	BI_3202	BI_3203	BI_3204	BI_3206	BI_3208	BI_3209	BI_3210
RT7001	*Conopeum seurati*	*Cryptosula pallasiana*	--	--	*Einhornia crustulenta*	*Einhornia crustulenta*	*Einhornia crustulenta*	--	--
RT7002	*Bispira polyomma*	--	--	--	*Sabella pavonina*	*- volutacornis*	*- volutacornis*	--	--
RT7003	*Molgula socialis*	*- manhattensis*	*- complanata*	--	*- oculata*	*Polycarpa fibrosa*	*- manhattensis*	--	--
RT7004	*Vesicularia spinosa*	--	--	--	--	--	--	--	--
RT7005	*Musculus discors*	*- niger*	--	--	--	--	--	--	--
RT7006	*Cellaria fistulosa*	--	--	--	--	--	--	--	--
RT7007	*Botryllus schlosseri*	--	--	*Botrylloides diegensis*	*Alcyonidium hirsutum*	--	--	--	--
RT7008	*Watersipora subatra*	*- subtorquata*	--	--	*Smittina landsborovii*	--	--	--	--
RT7009	*Semibalanus balanoides*	*Balanus crenatus*	*Balanus crenatus*	*Balanus crenatus*	*Balanus crenatus*	*Balanus crenatus*	*Balanus crenatus*	--	--
RT7010	*Lafoea dumosa*	*Ptychogena crocea*	--	*Zygophylax pinnata*	*Filicrisia geniculata*	--	--	--	--
RT7011	*Sabellaria spinulosa*	--	--	--	--	--	--	--	--
RT7012	*Mytilus edulis*	--	--	--	--	--	--	--	--
RT7013	*Cryptosula pallasiana*	--	--	--	--	--	--	--	--
RT7014	*Bugulina fulva*	--	--	*- flabellata*	--	--	--	--	--
RT7015	*Sabella pavonina*	*Potamilla neglecta*	*Bispira volutacornis*	--	*Parasabella cambrensis*	--	--	--	--
RT7016	*Electra pilosa*	--	--	--	--	--	--	--	--
RT7017	*Verruca stroemia*	--	--	--	--	--	--	--	--
RT7018	*Balanus balanus*	*- crenatus*	*Perforatus perforatus*	--	*Austrominius modestus*	*Austrominius modestus*	--	--	--
RT7019	*Hydroides norvegica*	--	--	--	--	--	--	--	--
RT7020	*Amphisbetia operculata*	--	--	--	--	--	--	--	--
RT7021	*Bicellarina alderi*	--	--	--	*Tricellaria ternata*	--	--	--	--
RT7022	*Alcyonidium parasiticum*	--	--	--	*Vesicularia spinosa*	*Turbicellepora avicularis*	--	--	--
RT7023	*Spirobranchus lamarcki*	--	--	--	*Placostegus tridentatus*	--	--	--	--
RT7024	*Musculus subpictus*	--	--	--	--	--	--	--	--
RT7025	*Bugula neritina*	--	--	--	--	--	--	--	--

Table 3 (cont.). The identification of fauna made by participating laboratories for RT70 (arranged by participant). Names are given only where different from the AQC identification.

	Taxon	BI_3211	BI_3212	BI_3213	BI_3214a	BI_3214b	BI_3215	BI_3216	BI_3217
RT7001	*Conopeum seurati*	- -	- -	*- reticulum*	*- reticulum*	*- reticulum*	- -	- -	- -
RT7002	*Bispira polyomma*	- -	- -	*Sabella spallanzanii*	- -	- -	- -	- -	*- volutacornis*
RT7003	*Molgula socialis*	*- [manhattensis]*	*- [manhattensis agg.]*	*- [manhattensis]*	*- occulta*	*- oculata*	*- manhattensis*	- -	*Eugyrioides arenosus*
RT7004	*Vesicularia spinosa*	- -	- -	- -	- -	- -	- -	- -	*Obelia longissima*
RT7005	*Musculus discors*	- -	- -	- -	- -	- -	- -	- -	- -
RT7006	*Cellaria fistulosa*	- -	- -	- -	- -	- -	- -	- -	- -
RT7007	*Botryllus schlosseri*	- -	- -	- -	- -	- -	- -	- -	- -
RT7008	*Watersipora subatra*	- -	- -	- -	*- subtorquata*	- -	- -	- -	*- subtorquata*
RT7009	*Semibalanus balanoides*	- -	*Balanus crenatus*	*Balanus crenatus*	*Balanus crenatus*	*Balanus crenatus*	*Balanus crenatus*	*Balanus crenatus*	*Chirona hameri*
RT7010	*Lafoea dumosa*	- -	- -	- -	- -	- -	- -	- -	- -
RT7011	*Sabellaria spinulosa*	- -	- -	- -	- -	- -	- -	- -	*- alveolata*
RT7012	*Mytilus edulis*	- -	- -	- -	- -	- -	- -	- -	- -
RT7013	*Cryptosula pallasiana*	- -	- -	- -	*- [palliasiana]*	- -	- -	- -	- -
RT7014	*Bugulina fulva*	- -	- -	- -	- -	*- avicularia*	- -	- -	- -
RT7015	*Sabella pavonina*	- -	- -	- -	- -	- -	- -	- -	*- discifera*
RT7016	*Electra pilosa*	- -	- -	- -	- -	- -	- -	- -	*Caberea ellisii*
RT7017	*Verruca stroemia*	- -	- -	- -	- -	- -	- -	- -	- -
RT7018	*Balanus balanus*	- -	- -	- -	*- crenatus*	*- crenatus*	- -	- -	- -
RT7019	*Hydroides norvegica*	- -	- -	- -	- -	*[Hydoides] -*	- -	- -	- -
RT7020	*Amphisbetia operculata*	- -	- -	- -	- -	- -	- -	- -	- -
RT7021	*Bicellarina alderi*	- -	- -	- -	- -	*Bicellariella ciliata*	- -	- -	- -
RT7022	*Alcyonidium parasiticum*	- -	- -	- -	- -	- -	- -	- -	- -
RT7023	*Spirobranchus lamarcki*	- -	- -	- -	- -	- -	- -	- -	- -
RT7024	*Musculus subpictus*	- -	- -	- -	- -	- -	- -	- -	- -
RT7025	*Bugula neritina*	- -	- -	- -	- -	- -	- -	- -	- -

Figure 26. The number of differences from the AQC identification of specimens distributed in RT70 for each of the participating laboratories. Arranged in order of increasing number of differences (by specific followed by generic errors).



Theme identification attempts

RT70 included an option for participants to identify the target theme. Since RT68, the target theme has not be revealed before the interim report. Laboratories' theme identification attempts are listed below.

- Lab 02: Species of hard substrates.
- Lab 03: hard substrate fauna.
- Lab 04: fouling sessile filter-feeders.
- Lab 06: Epifauna.
- Lab 08: Biofouling species.
- Lab 09: Suspension feeders.
- Lab 10: Biofoulers.
- Lab 11: Epifauna.
- Lab 12: filter feeders.
- Lab 13: Epifaunal specimens.
- Lab 14a: Epifauna.
- Lab 15: Fouling species.
- Lab 16: [Suspension feeders?].
- Lab 17: Encrusting fauna.

Most attempts were close to the target theme (sessile fauna).

Labs 01 and 14b gave no theme suggestion (Labs 05, 07, 18, 19 and 20 submitted no results).

Taxonomic and Identification policy considerations highlighted by RT70

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.

The taxonomic and identification policy considerations section was first added at the end of the RT54 bulletin, to include detail for which there was not enough space alongside images. Since RT61, more detailed notes have been provided for each of the families represented in the ring test, as progress towards a Taxonomic Discrimination Protocol (TDP) to standardise future data and help with the interpretation of past and current data. A draft TDP was published in 2023 (Worsfold *et al.*, 2023). TDP implications, including recommendations and historical data implications, are also included. For each family, notes from the species directory (SD) of the marine fauna and flora of the British Isles and surrounding seas (Howson & Picton, 1997) and the current register of Marine Species for the British Isles and Adjacent Seas (MSBIAS): https://www.marinespecies.org/msbias/, which is a subregister of the World Register of Marine Species (WoRMS) website: http://www.marinespecies.org/index.php are included for the circulated taxa. MSBIAS is derived from the Unicorn database and Marine Recorder but requires revision (e.g. including tropical species added with Unicorn for overseas projects, mentioned below for relevant families).

Howson, C.M. & Picton, B.E., (Eds.) 1997. *The species directory of the marine fauna and flora of the British Isles and surrounding seas.* Ulster Museum and the Marine Conservation Society, Belfast and Ross-on-Wye, Ulster Museum Publication No. 276, vi + 508 pp.

Worsfold, T.M., Hall, D.J. & O'Reilly, M. (Ed.), 2023. *Development of standard recording policies for laboratory analysis of north-east Atlantic macrobenthos samples, including a draft Taxonomic Discrimination Protocol (TDP) down to Family level*. Report to the NMBAQC Scheme participants. 48pp, August 2023.

Cnidaria

Lafoeidae (RT7010). The draft TDP suggests species level identifications for Lafoeidae, to be recorded as presence/absence, as currently done at APEM. The standard guide is Cornelius (1995). ***Lafoea dumosa*** was first circulated in 2026 **(RT7010)**. Most labs correctly identified **RT7010** (19% error), suggesting no need for change.

Cornelius, P.F.S., 1995. *North-west European thecate hydroids and their medusae. Part 1, Introduction, Laodiceidae to Haleciidae. Keys and notes for the identification of the species*. Synopses of the British Fauna (New Series), No. 50. Published for The Linnean Society of London and The Estuarine and Coastal Sciences Association by Field Studies Council, Shrewsbury, 347 pp.

Sertulariidae (RT7020). The draft TDP flags this family for further work, due to the different taxonomic levels currently used for different taxa by different labs. APEM leave *Sertularia*, *Diphasia* and *Sertularella* at genus and record others at species. The standard guide is Cornelius (1995). ***Amphisbetia operculata*** was first circulated in 2026 **(RT7020)**. All labs correctly identified **RT7020**, suggesting no need for change.

Cornelius, P.F.S., 1995. *North-west European thecate hydroids and their medusae. Part 2, Sertulariidae to Campanulariidae. Keys and notes for the identification of the species*. Synopses of the British Fauna (New Series), No. 50. Published for The Linnean Society of London and The Estuarine and Coastal Sciences Association by Field Studies Council, Shrewsbury, 386 pp.

Annelida

Sabellariidae (RT7011). The draft TDP suggests species level identifications for Sabellariidae without separation of juveniles, as currently done at APEM. *Sabellaria* can be identified using Hayward & Ryland (2017). ***Sabellaria spinulosa*** was circulated in 1994 (RT0207), with 0% error, 2004 (RT2301), with 13% error, 2015 (RT4908), with 15% error and 2026 (**RT7011**). Most labs identified **RT7011** correctly (6% error), suggesting no need for change.

Hayward, P.J. & Ryland, J.S. (eds.), 2017. *Handbook of the marine fauna of North-West Europe; Second Edition*. Oxford university press, 785pp.

Sabellidae (RT7002, RT7015). The draft TDP flags Sabellidae for further work, due to taxonomic flux and different taxonomic levels currently used for different taxa by different labs. It is a large and difficult family that includes several non-native species in UK waters and overseas. The 2014 Scheme workshop covered sabellids, resulting in the guide (Giangrande et al., 2015) that became a standard identification resource for the family in Europe, though several other publications are needed for detailed descriptions and updated taxonomy. Only *Sabella* and *Bispira* are discussed further, here; both were reviewed by Knight-Jones & Perkins (1998). Capa (2008) suggested that monophyletic *Bispira* would include *Branchiomma* but did not formally make the taxonomic change. Putignano *et al.* (2023) transferred *Pseudobranchiomma tarantoensis* to *Sabella*. Cepeda & Lattig (2017) described *B. primaoculata* from the Alboran Sea. Faasse & Giangrande (2012) described *Bispira polyomma* from Dutch waters, as a possible introduction, with differences from other *Bispira*. It was then found near Plymouth in 2021 (Bishop & Darbyshire, 2023) and in northern France (Droual et al., 2024). Its origin remains unknown. ***Bispira polyomma*** was first circulated in 2026 **(RT7002)**. Most labs identified **RT7002** correctly but there were several differences (31% error), some for *Bispira volutacornis*, suggesting missed literature, others for *Sabella* spp. ***Sabella pavonina*** was circulated in 1995 (RT0503) with 43% error, 2001 (RT1724) with 39% error, 2005 (RT2601) with 29% error, 2020 (RT5822) with 32% error and 2026 (**RT7015**). Most labs identified **RT7015** correctly but there were some differences (25% error).

Bishop, J.D.D. & Darbyshire, T., 2023. The first UK records of the purple fan-worm, *Bispira polyomma* Giangrande & Faasse, 2012 (Annelida: Sabellidae). *BioInvasions Records*, 12(1), 186-195. https://www.reabic.net/journals/bir/2023/Issue1.aspx

Capa, M., 2008. The genera *Bispira* Krøyer, 1856 and *Stylomma* Knight-Jones, 1997 (Polychaeta, Sabellidae): systematic revision, relationships with close related taxa and new species from Australia. *Hydrobiologia*, 596, 301-327.

Capa, M., 2008. The genera *Bispira* Krøyer, 1856 and *Stylomma* Knight-Jones, 1997 (Polychaeta, Sabellidae): systematic revision, relationships with close related taxa and new species from Australia. *Hydrobiologia*, 596, 301-327. DOI 10.1007/s10750-007-9105-2

Cepeda, D. & Lattig, P., 2017. New reports and description of a new species of Sabellidae (Annelida) for the Iberian Peninsula and Balearic Archipelago. *Marine Biology Research*, 1-22. http://www.tandfonline.com/doi/full/10.1080/17451000.2017.1303576

Droual, G., Curd, A., Gauff, R., Gouillieux, B., Gélinaud, G., Cabelguen, J. & Grall, J., 2024. The French benthic newcomers: new records of *Ampithoe valida* S.I. Smith, 1873 and *Polydora colonia* Moore, 1907 in Brittany, first record of *Bispira polyomma* Giangrande & Faasse, 2012 in the North-East Atlantic and northernmost record of *Prostheceraeus moseleyi* Lang, 1884 in Europe. *BioInvasions Records*, 13(1), 37-56, https://doi.org/10.3391/bir.2024.13.1.05

Faasse, M. & Giangrande, A., 2012. Description of *Bispira polyomma* n. sp. (Annelida: Sabellidae): a probable introduction to The Netherlands. *Aquatic Invasions*, 7(2), 591-598. https://doi.org/10.3391/ai.2012.7.4.016

Giangrande, A., Licciano, M. & Wasson, B., 2015. Guide to Identification of Sabellidae and Fabriciidae (Polychaeta) in north east Atlantic and Mediterranean waters. NMBAQC 2014 taxonomic workshop, Dove Marine Laboratory, 91pp. (unpublished).

Knight-Jones, P. & Perkins, T.H., 1998. A revision of *Sabella*, *Bispira* and *Stylomma* (Polychaeta: Sabellidae). *Zoological Journal of the Linnean Society*, 123, 385-467. http://dx.doi.org/10.1111/j.1096-3642.1998.tb01370.x

Putignano, M., Çinar, M.E., Pelaprat, C. & Giangrande, A., 2023. New combinations of two *Pseudobranchiomma* species (Annelida: Sabellidae): The difficulty in establishing a boundary layer among genera within the Sabellinae. *Mediterranean Marine Science*, 24(2), 292-298. https://ejournals.epublishing.ekt.gr/index.php/hcmr-med-mar-sc/article/view/32610

Serpulidae (RT7019, RT7023). The draft TDP flags Serpulidae for further work, due to different taxonomic levels currently used for different taxa by different labs. APEM identify most non-spirorbins to species for specimens that retain an operculum but leave Spirorbinae and *Salmacina dysteri* recorded as 'present' and at subfamily level; and leave specimens that have lost their opercula as Sabellidae. Enumeration is a problem for Spirorbinae, as the tubes may be found in large numbers and it is difficult to determine the number of live-collected individuals without destroying the tubes; further discussion is needed for these taxa. This is also a problem for some other serpulids, such as *Salmacina*. Most serpulids can be identified using Hayward & Ryland (2017); Rzhavsky et al. (2018) is also useful. ***Hydroides norvegica*** was circulated in 1996 (RT0817), with 0% error and 2026 (**RT7019**). All labs identified **RT7019** correctly. ***Spirobranchus lamarcki*** was circulated in 1995 (RT0405, as *Pomatoceros lamarcki*), with 26% error, 1998 (RT1222, as *Pomatoceros lamarcki*), with 0% error, 2002 (RT2023, as *Pomatoceros lamarcki*), with 0% error, 2004 (RT2303, as *Pomatoceros lamarcki*), with 7% error, 2007 (RT3209, as *Pomatoceros lamarcki*), with 4% error, 2010 (RT3802, as *Pomatoceros lamarcki*), with 14% error, 2014 (RT4622), with 4% error, (RT4710), with 5% error and 2026 (**RT7023**). Most labs identified **RT7019** correctly (6% error).

Hayward, P.J. & Ryland, J.S. (eds.), 2017. *Handbook of the marine fauna of North-West Europe; Second Edition*. Oxford university press, 785pp.

Rzhavsky, A.V., Kupriyanova, E.K. & Sikorski, A.V., 2018. *Field guide to calcareous tubeworms (Polychaeta, Serpulidae) of the Arctic Ocean*. KMK Scientific Press, Moscow, 187pp.

Arthropoda

Verrucidae (RT7017). The draft TDP suggests species identifications for verrucids, with juveniles separated at 2mm. APEM previously identified juveniles (under 2mm) at order level, with a juvenile qualifier, and specimens with internal parts only at order level. This was when the order was taken to be 'Cirripedia'; Verrucidae are now considered to be a separate order from Balanomorpha and APEM now identify verrucids to species, at all sizes and conditions, without qualifiers. The standard guide is Southward (2008). ***Verruca stroemia*** was circulated in 2013 (RT4512), with 0% error and 2026 (**RT7017**). All labs identified **RT7017** correctly.

Southward, A.J., 2008. *Barnacles. Keys and notes for the identification of British species*. Synopses of the British Fauna (New Series), No. 57. Published for The Linnean Society of London and The Estuarine and Coastal Sciences Association by Field Studies Council, Shrewsbury, 140 pp., Plates 1-4.

Balanidae (RT7009, RT7018). For balanids, the draft TDP suggests: species identifications for specimens over 2mm with shell plates intact (*e.g. Semibalanus balanoides*); juveniles (under 2mm) to be identified at order level, with a juvenile qualifier (*e.g.* Balanomorpha juv.); specimens with internal parts only to be identified at order level, without qualifiers (*e.g.* Balanomorpha). Higher taxon records for barnacles vary between laboratories and have changed with time, due to taxonomic flux. APEM previously recorded 'Cirripedia', then 'Sessilia' but changed to 'Balanomorpha' (for the order level), following WoRMS. The standard guide is Southward (2008). *Balanus crenatus* was circulated in 2019 (RT5703), with 30% error. ***Semibalanus balanoides*** was first circulated in 2026 (**RT7009**, elongated individuals), originally as *B. crenatus*. Most labs also identified **RT7009** as *B. crenatus* but Lab 10 provided evidence that they were *S. balanoides*, such that most identifications were incorrect (81% error), with additional references (Pilsbry, 1916; Stubbings, 1975). Where the basis is missing, it seems that the differences in the opercular plates can be misleading and the structure of the cirri and penis (Balanidae are hermaphrodite) may be necessary for confirmation. ***Balanus balanus*** was first circulated in 2026 (**RT7018**, damaged specimens with several missing plates). Most labs identified **RT7018** correctly but there were some differences (38% error).

Pilsbry, H.A., 1916. The sessile barnacles (Cirripedia) contained in the collections of the U.S. National Museum; including a monograph of the American species. *Bulletin of the United States National Museum*, 93, i-xi+1-366, 99 figs, 76 pls.

Southward, A.J., 2008. *Barnacles. Keys and notes for the identification of British species*. Synopses of the British Fauna (New Series), No. 57. Published for The Linnean Society of London and The Estuarine and Coastal Sciences Association by Field Studies Council, Shrewsbury, 140 pp., Plates 1-4.

Stubbings, H.G., 1975. *Balanus balanoides*. Liverpool University Press. (L.M.B.C. Memoir No. 37). x+174pp.

Mollusca

Mytilidae (RT7005, RT7012, RT7024). The draft TDP flags mytilids for further work, mainly due to differences between labs in the treatment of juveniles. Only *Mytilus* and *Musculus* are discussed below. APEM identify *Mytilus* to species, with juveniles separated below 5mm. Bivalve identifications once relied on Tebble (1966). Today, most identifications can be made using the Amgueddfa Cymru website (Oliver et al., 2016), although many more recent papers may be necessary for problem groups. ***Mytilus edulis*** was circulated in 1995 (RT0506), with 24% error, 1997 (RT1006), with 55% error, 2000 (RT1518), with 0% error, 2001 (RT1712), with 33% error, 2004 (RT2322), with 20% error, 2005 (RT2604), with 21% error, 2008 (RT3408), with 48% error, 2012 (RT4310), with 32% error, 2014 (RT4607), with 0% error, 2021 (RT6002), with 12% error and 2026 (**RT7012**). All labs identified **RT7012** as *M. edulis* but several noted likely confusion with the other members of the genus (*M. trossulus*; *M. galloprovincialis* and hybrids) and it may be more appropriate to use genus level records for *Mytilus*. The notes below relate to *Musculus*, which APEM speciate at all sizes, without separation of juveniles. ***Musculus discors*** was circulated in 1997 (RT1005), with 32% error, 2010 (RT3913), with 46% error and 2026 (**RT7005**). Most labs identified **RT6705** correctly (6% error). ***Musculus subpictus*** was circulated in 1998 (RT1210, as *Modiolarca tumida*), with 33% error, 2000 (RT1511, as *M. tumida*), with 44% error, 2004 (RT2420,

as *M. tumida*), with 7% error, 2007 (RT3219, as *M. tumida*), with 52% error, 2011 (RT4110), with 39% error, 2014 (RT4611), with 4% error, (RT4725), with 10% error, 2020 (RT5804), with 47% error, and 2026 (**RT7024**). All labs identified **RT6724** correctly.

Oliver, P.G., Holmes, A.M., Killeen, I.J. & Turner, J.A., 2016. *Marine Bivalve Shells of the British Isles*. Amgueddfa Cymru - National Museum Wales. http://naturalhistory.museumwales.ac.uk/britishbivalves [Accessed: 1 May 2026]

Tebble, N., 1966. *British bivalve seashells. A handbook for identification*. Trustees of the British Museum (Natural History), 212pp.

Bryozoa

Alcyonidiidae (RT7022). The draft TDP flags Alcyonidiidae for further work, due to taxonomic flux. APEM record many at species level but use '*Alcyonidium diaphanum* agg.' for erect growing species and leave some at family level, particularly those that resemble *Alcyonidioides mytili* but are found growing on stones; all recorded as presence/absence. The standard guide is Hayward (1985) but there have been several changes published, since (*e.g.* De Blauwe, 2025, Denisenko, 2009, d'Hondt, 2021, Porter, 2004, Ryland & Porter, 2000). Most alcyonidiids are *Alcyonidium* but '*A. mytili*' has been transferred to *Alcyonidioides* and two deep water genera are included in Hayward (1985), of which *Bockiella* was listed under Flustrellidridae. ***Alcyonidium parasiticum*** was first circulated in 2026 **(RT7022)**. Most labs correctly identified **RT7022** (13% error).

De Blauwe, H., 2025. *Marine and brackish bryozoans from the Southern Bight of the North Sea: Identification Guide for Belgium, the Netherlands and the North Sea coast of Germany*. Springer, 422pp.

Denisenko, N.V., 2009. The new species and new records of rare ctenostome bryozoans of the genus *Alcyonidium* in the Russian Arctic Seas. *Proceedings of Zoological Institute of RAS*, 313(4), 419-426.

d'Hondt, J.L., 2021. Brève chronique du genre *Alcyonidium* Lamouroux, 1813, Bryozoaires, Cténostomes. *Bulletin de la Societe Zoologique de France*, 146(2), 75-86

Hayward, P.J., 1985. *Ctenostome bryozoans*. *Keys and notes for the identification of the species.* Synopses of the British Fauna (New Series), No. 33. Published for the Linnean Society of London and The Estuarine and Brackish-Water Sciences Association by E.J. Brill/ Dr. W. Backhuys, London, Leiden, Köln, København, 169pp.

Porter, J.S., 2004. Morphological and genetic characteristics of erect subtidal species of *Alcyonidium* (Ctenostomata: Bryozoa). *Journal of the Marine Biological Association of the United Kingdom*, 84(1), 243-252.

Ryland, J.S. & Porter, J.S., 2000. *Alcyonidium reticulum* sp. nov., a common intertidal bryozoan from south-west Britain. *Journal of the Marine Biological Association of the United Kingdom*, 80, 563-564.

Vesiculariidae (RT7004). The draft TDP flags Vesiculariidae for further work, due to different taxonomic levels used for different taxa by different labs. APEM record *Vesicularia spinosa* and some *Amathia*, which includes a non-native horizon species (Martínez & Adarraga, 2024), at species level but leave those previously included in *Bowerbankia* (now synonymised with *Amathia* – Waeschenbach *et al*., 2015) at genus level; all recorded as presence/absence. The standard

guide is Hayward (1985) but De Blauwe (2025) places *Vesicularia* in *Amathia*. ***Vesicularia spinosa*** was was circulated in 1995 (RT0416) with 26% error and 2026 **(RT7004)**. Most labs correctly identified **RT7004** (6% error), suggesting no need for change.

De Blauwe, H., 2025. *Marine and brackish bryozoans from the Southern Bight of the North Sea: Identification Guide for Belgium, the Netherlands and the North Sea coast of Germany*. Springer, 422pp.

Hayward, P.J., 1985. *Ctenostome bryozoans*. *Keys and notes for the identification of the species.* Synopses of the British Fauna (New Series), No. 33. Published for the Linnean Society of London and The Estuarine and Brackish-Water Sciences Association by E.J. Brill/ Dr. W. Backhuys, London, Leiden, Köln, København, 169pp.

Martínez, J. & Adarraga, I., 2024. Presencia del briozoo exótico *Amathia verticillata* (Delle Chiaje, 1822) (Ctenostomatida: Vesiculariidae) en la costa del País Vasco (SE del golfo de Vizcaya). *Munibe Ciencias Naturales. Natur zientziak*, 72, 113-122.

Waeschenbach, A., Vieira, L.M., Reverter-Gil, O., Souto-Derungs, J., Nascimento, K.B. & Fehlauer-Ale, K.H., 2015. A phylogeny of Vesiculariidae (Bryozoa, Ctenostomata) supports synonymization of three genera and reveals possible cryptic diversity. *Zoologica Scripta*, 44(6), 667-683. doi:10.1111/zsc.12130

Electridae (RT7001, RT7016). The draft TDP suggests species level identifications for Electridae, to be recorded as presence/absence, as currently done at APEM. The standard guide is Hayward & Ryland (1998), replacing Ryland & Hayward (1977), but there have been some more recent changes (De Blauwe, 2025, Nikulina, 2007; 2008; Nikulina *et al*., 2013). ***Conopeum seurati*** was first circulated in 2026 **(RT7001)**. About half of the labs correctly identified **RT7001** (44% error). Illustrations of development stages are given by Cook & Hayward (1966). ***Electra pilosa*** was first circulated in 2026 **(RT7016)**. Most labs correctly identified **RT7016** (6% error). Labs 09 and 12 noted that *E. Pilosa* should be considered a species complex following recent molecular phylogenies (Nikulina *et al*., 2007; Nauta *et al*., 2023).

De Blauwe, H., 2025. *Marine and brackish bryozoans from the Southern Bight of the North Sea: Identification Guide for Belgium, the Netherlands and the North Sea coast of Germany*. Springer, 422pp.

Cook, P.L. & Hayward, P.J., 1966. The development of *Conopeum seurati* (Canu) and some other species of membraniporine Polyzoa. *Cahiers de Biologie Marine*, 7, 437-443.

Hayward, P.J. & Ryland, J.S., 1998. *Cheilostomatous Bryozoa Part 1: Aeteoidea – Cribilinoidea*. Synopses of the British Fauna (NS), 10. Published for the Linnean Society of London and The Estuarine and Brackish Water Sciences Association by E.J. Brill/ Dr. W. Backhuys, 366pp.

Nauta, R.W., Gittenberger, A., Claassen, J. &Philippart, C.M.J., 2023. *Mosdiertjes op het strand van Nederland: bronnen, soorten en handelingsperspectieven: quickscan 2023-01*. Waddenacademie, Leeuwarden. 22p.

Nikulina, E.A., 2007. *Einhornia*, a new genus for electrids formerly classified as the *Electra crustulenta* species group (Bryozoa, Cheilostomata). *Schriften des Naturwissenschaftlichen Vereins für Schleswig-Holstein*, 69, 29-40.

Nikulina, E.A., 2008. Taxonomy and ribosomal DNA-based phylogeny of the *Electra crustulenta* species group (Bryozoa: Cheilostomata) with revision of Borg's varieties and description of *Electra moskvikvendi* sp. nov. from the western Baltic Sea. *Organisms Diversity & Evolution*, 8(3), 215-229.

Nikulina, E.A., Hanel, R. & Schäfer, P., 2007. Cryptic speciation and paraphyly in the cosmopolitan bryozoan *Electra Pilosa* — Impact of the Tethys closing on species evolution. *Molecular Phylogenetics and Evolution*, 45(3), 765-776.

Nikulina, E.A., De Blauwe, H. & Reverter-Gil, O., 2013. Molecular phylogenetic analysis confirms the species status of *Electra verticillata* (Ellis and Solander, 1786). *Bryozoan Studies*, 2010, 217-236. DOI: 10.1007/978-3-642-16411-8_15

Ryland, J.S. & Hayward, P.J., 1977. *British Anascan Bryozoans. Cheilostomata: Anasca*. *Keys and notes for the identification of the species.* Synopses of the British Fauna (New Series), No. 10, Published for the Linnean Society of London by Academic Press, London, New York, San Francisco, 188 pp.

Bugulidae (RT7014, RT7021, RT7025). The draft TDP flags Bugulidae for further work, due to different taxonomic levels currently used for different taxa by different labs and difficulties with fragmentary colonies. APEM currently attempt identification at species level, as presence/absence, unless very small and damaged. The standard guide is Hayward & Ryland (1998), replacing Ryland & Hayward (1977). Most former *Bugula* are now *Crisularа* or *Bugulina*, following Fehlauer-Ale *et al*. (2015). Non-native '*Bugula*' were reviewed by Ryland *et al*. (2011); ***Bugula neritina*** was first circulated in 2026 **(RT7025)**. All labs correctly identified **RT7025** Lab10 noted that it was a species complex; several genetic lineages have been identified but not yet formally described as separate species (Fehlauer-Ale *et al*., 2014). ***Bugulina fulva*** was first circulated in 2026 **(RT7014)**. Most labs correctly identified **RT7014** (13% error). ***Bicellarina alderi*** was first circulated in 2026 **(RT7021)**. Most labs correctly identified **RT7021** (13% error).

Fehlauer-Ale, K.H., Mackie, J.A., Lim-Fong, G.E., Ale, E., Pie, M.R. & Waeschenbach, A., 2014. Cryptic species in the cosmopolitan *Bugula neritina* complex (Bryozoa, Cheilostomata). *Zoologica Scripta*, 43, 193-205.

Fehlauer-Ale, K.H., Winston, J.E., Tilbrook, K.J., Nascimento, K.B. & Vieira, L.M., 2015. Identifying monophyletic groups within *Bugula sensu lato* (Bryozoa, Buguloidea). *Zoologica Scripta*, 44(3), 334-347.

Hayward, P.J. & Ryland, J.S., 1998. *Cheilostomatous Bryozoa Part 1: Aeteoidea – Cribilinoidea*. Synopses of the British Fauna (NS), 10. Published for the Linnean Society of London and The Estuarine and Brackish Water Sciences Association by E.J. Brill/ Dr. W. Backhuys, 366pp.

Ryland, J.S., Bishop, J.D.D., Blauwe, H. de, Nagar, A.E., Minchin, D., Wood, C.A. & Yunnie, A.L.E., 2011. Alien species of *Bugula* (Bryozoa) along the Atlantic coasts of Europe. Aquatic Invasions, 6(1), 17-31.

Ryland, J.S. & Hayward, P.J., 1977. *British Anascan Bryozoans. Cheilostomata: Anasca*. *Keys and notes for the identification of the species.* Synopses of the British Fauna (New Series), No. 10, Published for the Linnean Society of London by Academic Press, London, New York, San Francisco, 188 pp.

Cellaridae (RT7006). The draft TDP suggests genus level identifications for Cellariidae, to be recorded as presence/absence, as currently done at APEM. The standard guide is Hayward &

Ryland (1998), replacing Ryland & Hayward (1977). Almeida *et al*. (2018) provide an identification table to all Atlantic species (but without distribution summaries). ***Cellaria fistulosa*** was first circulated in 2026 **(RT7006)**. All labs correctly identified **RT7006**, suggesting species level identifications may be possible.

Almeida, A.C., Souza, F.B. & Vieira, L.M., 2018. A new species of *Cellaria* (Bryozoa: Cheilostomata) from northeastern Brazil, with a tabular identification key to the Atlantic species. *Zoologia.* 35, 1-7. https://doi.org/10.3897/zoologia.35.e24571

Hayward, P.J. & Ryland, J.S., 1998. *Cheilostomatous Bryozoa Part 1: Aeteoidea – Cribilinoidea*. Synopses of the British Fauna (NS), 10. Published for the Linnean Society of London and The Estuarine and Brackish Water Sciences Association by E.J. Brill/ Dr. W. Backhuys, 366pp.

Ryland, J.S. & Hayward, P.J., 1977. *British Anascan Bryozoans. Cheilostomata: Anasca*. *Keys and notes for the identification of the species.* Synopses of the British Fauna (New Series), No. 10, Published for the Linnean Society of London by Academic Press, London, New York, San Francisco, 188 pp.

Watersiporidae (RT7008). The draft TDP suggests species level identifications for Watersiporidae, to be recorded as presence/absence, as currently done at APEM. The standard guide (Hayward & Ryland, 1999), replacing Hayward & Ryland (1979), includes only the uncommon, native *Watersipora complanata*, which is now *Terwasipora complanata*, following Reverter-Gil & Souto (2019). The family also includes non-native species. '*Watersipora subtorquata*' was recorded from Arcachon (western France) in 2003, Plymouth (southwest England) in 2008 (Ryland *et al*., 2009) and Dublin (eastern Ireland) in 2011 (Kelso & Jackson, 2012). The identity of these records was revised to *W. subatra* by (Vieira *et al*., 2014), with a key to global *Watersipora,* and a review of non-native species, updated by Gauff *et al*. (2023); others could be found in UK waters in future. ***Watersipora subatra*** was first circulated in 2026 **(RT7008)**. Most labs correctly identified **RT7008** (25% error), with the differences due to use of previous literature identifying *W. subtorquata*, suggesting no need for change.

Gauff, R.P.M., Bouchoucha, M., Curd, A., Droual, G., Evrard, J., Gayet, N. & Nunes, F., 2023. First joint morphological and molecular detection of *Watersipora subatra* in the Mediterranean Sea presented in an updated genus phylogeny to resolve taxonomic confusion. *Aquatic Invasions*, 18(3), 295-312. https://doi.org/10.3391/ ai.2023.18.3.108128

Hayward, P.J. & Ryland. J.S., 1979. *British Ascophoran Bryozoans*. *Keys and notes for the identification of the species.* Synopses of the British Fauna (New Series), No. 14. Published for the Linnean Society of London and the Estuarine and Brackish-Water Sciences Association by Academic Press, London, New York, San Francisco, 312 pp.

Hayward, P.J. & Ryland, J.S., 1999. *Cheilostomatous Bryozoa Part 2, Hippothooidea - Celleporoidea*. Synopses of the British Fauna (New Series), No. 14. (Second Edition) Published for the Linnean Society of London and The Estuarine and Coastal Sciences Association by Field Studies Council, Shrewsbury, 416pp.

Kelso, A. & Jackson, P.N.W., 2012. Invasive bryozoans in Ireland: first record of *Watersipora subtorquata* (d'Orbigny, 1852) and an extension of the range of *Tricellaria inopinata* d'Hondt and Occhipinti Ambrogi, 1985. *BioInvasions Records*, 1(3), 209-214.

Reverter-Gil, Ó. & Souto, J., 2019. Watersiporidae (Bryozoa) in Iberian waters: an update on alien and native species. *Marine Biodiversity*, 49, 2735-2752. https://doi.org/10.1007/s12526-019-01003-4

Ryland, J.S., Blauwe, H. de, Lord, R. & Mackie, J.A., 2009. Recent discoveries of alien *Watersipora* (Bryozoa) in Western Europe, with redescriptions of species. *Zootaxa*, 2093, 43-59.

Vieira, L.M., Spencer Jones, M.E. & Taylor, P.D., 2014. The identity of the invasive fouling bryozoan *Watersipora subtorquata* (d'Orbigny) and some other congeneric species. *Zootaxa*, 3857(2), 151-182.

Cryptosulidae (RT7013). The draft TDP suggests species level identifications for Cryptosulidae, to be recorded as presence/absence, as currently done at APEM. The standard guide is Hayward & Ryland (1999), replacing Hayward & Ryland (1979). ***Cryptosula pallasiana*** was first circulated in 2026 **(RT7013)**. All labs correctly identified **RT7013**, suggesting no need for change.

Hayward, P.J. & Ryland. J.S., 1979. *British Ascophoran Bryozoans*. *Keys and notes for the identification of the species.* Synopses of the British Fauna (New Series), No. 14. Published for the Linnean Society of London and the Estuarine and Brackish-Water Sciences Association by Academic Press, London, New York, San Francisco, 312 pp.

Hayward, P.J. & Ryland, J.S., 1999. *Cheilostomatous Bryozoa Part 2, Hippothooidea - Celleporoidea*. Synopses of the British Fauna (New Series), No. 14. (Second Edition) Published for the Linnean Society of London and The Estuarine and Coastal Sciences Association by Field Studies Council, Shrewsbury, 416pp.

Chordata

Styelidae (RT7007). The draft TDP suggests species identifications for solitary styelids over 5mm, with juveniles left at Class (Ascidiaceae), as currently done at APEM. Styelids include both solitary and colonial species, which should be counted or recorded as present, respectively. APEM record colonial styelids at species level, although some colonies may be left at genus, where identifying features are lacking. Standard ascidian guides include Berrill (1950) and Millar (1970); also, Hayward & Ryland (1990) included most of the species recorded at the time but many of these were excluded from the more concise update (Hayward & Ryland, 1995), while the most recent edition (Hayward & Ryland, 2017) included some additions, to both previous editions, but excludes many species that had been covered by Hayward & Ryland (1990). Ascidian identification was updated by Brunetti & Mastrototaro (2017), though this currently appears to be unobtainable, and a seasearch guide (Bowen *et al*., 2018) gives *in situ* features. However, many species have been newly recorded since, particularly non-natives, and additional resources are necessary. ***Botryllus schlosseri*** was first circulated in 2026 (**RT7007**). Most labs identified **RT7007** correctly (13% error). Lab 10 noted that it may be a species complex (Brunetti *et al*., 2020; Reem *et al*., 2021) but most seggregates are not yet described. TDP updates may be needed to account for colonial and cryptic species.

Berrill, N.J., 1950. *The Tunicata with an account of the British species*. Volume 133. The Ray Society, London, 354 pp.

Bowen, S., Goodwin, C., Kipling, D. & Picton, B., 2018. *Sea squirts and sponges of Britain and Ireland*. Wild Nature Press, Plymouth, for Seasearch, 200pp.

Brunetti, R. & Mastrototaro, F., 2017. *Ascidiacea of the European waters*. Fauna d'Italia, 51. Calderini, New Business Media, 447pp.

Brunetti, R., Griggio, F., Mastrototaro, F., Gasparini, F. & Gissi, C., 2020. Toward a resolution of the cosmopolitan *Botryllus schlosseri* species complex (Ascidiacea, Styelidae): mitogenomics and morphology of clade E (*Botryllus gaiae*). *Zoological Journal of the Linnean Society*, 20, 1-18. https://doi.org/10.1093/zoolinnean/zlaa023

Hayward, P.J. & Ryland, J.S., 1990. *The marine fauna of the British Isles and north-west Europe: Volume 2: Molluscs to chordates*. Clarenden Press, Oxford, 628-996.

Hayward, P.J. & Ryland, J.S., 1995. *Handbook of the marine fauna of the British Isles and north-west Europe*. Clarenden Press, Oxford, 800pp.

Hayward, P.J. & Ryland, J.S. (eds.), 2017. *Handbook of the marine fauna of North-West Europe; Second Edition*. Oxford university press, 785pp.

Millar, R.H., 1970. *British ascidians. Tunicata: Ascidiacea*. *Keys and notes for the identification of the species.* Synopses of the British Fauna (New Series), No.1. Published for The Linnean Society of London by Academic Press, London and New York, 88 pp.

Reem, E., Douek, J., & Rinkevich, B., 2021. A critical deliberation of the 'species complex' status of the globally spread colonial ascidian *Botryllus schlosseri*. *Journal of the Marine Biological Association of the United Kingdom*, 101(7), 1047-1060. doi:10.1017/S0025315422000029

Molgulidae (RT7003). The draft TDP flags varied options (more work required) for molgulids over 5mm, with juveniles left at class (Ascidiaceae), as currently done at APEM. Molgulidae can be identified using Monniot (1969). *Molgula complanata* was first circulated in 2024 (RT6618), with 41% error. There were five alternative names but many identifications were correct, for a difficult species, and only two generic errors. *Molgula citrina* was named for RT6618 by three labs. *Molgula manhattensis* was circulated in 1996 (RT0717), with 61% error, 2021 (RT6014, as an aggregate to include *M. socialis*), with 18% error. It was named for RT6617 and for RT6618 by one lab each. In 2026, ***Molgula socialis*** was circulated, as distinct from *M. manhattensis* agg. (RT6014 is here re-assigned to *M. socialis*). As *M. socialis* had been circulated in 2021 (RT6014, scored as *M. manhattensis* aggregate, to include *M. socialis*), for **RT7003**, *M. socialis* was circulated to distinguish from *M. manhattensis*. However, as participants may have perceived it as for RT6014, we scored identifications of '*M. manhattensis* agg.' (or any notes to indicate a species complex) as correct but scored a difference for unqualified identifications of *Molgula manhattensis*. Lab 10 noted that the complex also includes *M. tubifera*. These three species are distinguished by Monniot (1969). About half of the labs identified **RT7015** correctly (56% error). More discussion is needed for standardisation of juvenile sizes and to resolve the cryptic species, of which *M. manhattensis* is considered non-native (Arenas *et al*., 2006).

Arenas, F., Bishop, J.D.D., Carlton, J.T., Dyrynda, P.J., Farnham, W.F., Gonzalez, D.J., Jacobs, M.W., Lambert, C., Lambert, G., Nielsen, S.E., Pederson, J.A., Porter, J.S., Ward, S. & Wood, C.A., 2006. Alien species and other notable records from a rapid assessment survey of marinas on the south coast of England. *Journal of the Marine Biological Association of the United Kingdom*, 86 (6), 1329-1338. doi: 10.1017/S0025315406014354

Monniot, C., 1969. Les Molgulidae des mers Européennes. *Mémoires du Muséum National d'Histoire Naturelle, Nouvelle Série, Série A, Zoologie.* 55, 171-272.

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