NMBAQC

NE Atlantic Marine Biological Analytical Quality Control Scheme

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Ring Test Bulletin –
RTB#69: general/mixed taxa

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Ring Test 69 Details

Ring Test #69 (Year 32)
Type/Contents – General/mixed taxa
Circulated – 31/10/25
Results deadline – 12/12/25
Number of Subscribing Laboratories – 20
Number of Participating Laboratories – 16*
Number of Results Received – 17**
* Labs 07, 18 and 19 submitted no results;
Lab 05 submitted results after circulation of the interim report;
** multiple data entries per laboratory permitted.

Ring Test Specimen Return Instructions

Please return all ring test specimens by 27th March 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 69

RT69 was a general / mixed taxa ring test. However, two tanaid crustaceans and a thyasirid bivalve were included as links to the 2025 experts' workshop themes.

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.

Species are selected to improve our understanding of the fauna. This may be through inclusion of species not previously sent: RT69 included thirteen species never previously sent. 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. Eight (32%) of the 25 specimens circulated were annelids, including one sipunculan that would have been considered 'other phyla' in past years, eight (32%) were molluscs and nine (36%) were arthropods. 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.

For each family, taxonomic and Identification policy considerations are included in sections towards the end of the bulletin, with notes are included on 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 derived from records in the Unicorn database and Marine Recorder.

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.

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.

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 25 generic level differences (6% of all, 425, genus identifications received from participants) recorded in the 17 data sets received from 16 participating laboratories and 57 species level differences (13% of all, 425, species identifications received from participants). The results represent a low number of errors compared to most previous exercises, due to several specimens without errors. There were 24 specific differences for annelids (one of which would previously have been classed as 'other'), 19 for arthropods and 14 for molluscs; numbers of generic differences per major group were 8, 8 and 9, respectively.

Four of the species circulated were responsible for just over 50% of participants' species level identification differences. These were the polychaete annelids *Phyllodoce groenlandica* and *Amphicorina triangulata* and the amphipod crustaceans *Pleonexes gammaroides* and *Caprella acanthifera*. Eight of the twenty-five specimens circulated: the polychaete annelids *Ceratocephale loveni* and *Dasybranchus caducus*, the amphipod crustaceans *Westwoodilla caecula* and *Microdeutopus anomalus*, the isopod crustacean *Idotea pelagica*, the decapod crustacean *Palaemon varians*, the bivalve mollusc *Timoclea ovata* and the gastropod mollusc *Rissoa membranacea* were correctly identified by all participants. Some differences were due to selection of small specimens (*e.g. P. groenlandica*) or inherent difficulties with examination (*e.g. P. gammaroides*, *A. triangulata*). Others related to literature awareness (*e.g.* highlighting the need for the updates for Tanaidacea).

Table 1. Species circulated for RT69, with summary of differences

Specimen	Genus	Species	Condition / Size	Total differences for 17 returns	
				Genus	Species
RT6901	*Timoclea*	*ovata*	Good; Small, 2-3mm	0	0
RT6902	*Dasybranchus*	*caducus*	Fair, thorax and abdomen; Medium	0	0
RT6903	*Parvicardium*	*exiguum*	Good; Small, 2-4mm	0	1
RT6904	*Nucula*	*sulcata*	Good; Small, 2-3mm	0	4
RT6905	*Westwoodilla*	*caecula*	Fair, at least one G1 & G2; Female; Medium	0	0
RT6906	*Microdeutopus*	*anomalus*	Fair, at least one G1, no antennae; Male; Medium	0	0
RT6907	*Ceratocephale*	*loveni*	Fair, proboscis not everted; Small	0	0
RT6908	*Idotea*	*pelagica*	Good; Medium, 5-6mm	0	0
RT6909	*Okenia*	*nodosa*	Fair; Small, 3-5mm	1	1
RT6910	*Caprella*	*acanthifera*	Fair; Female; Small	3	6
RT6911	*Nucella*	*lapillus*	Good; Medium, 20-30mm	2	2
RT6912	*Pleonexes*	*gammaroides*	Good; Female; Small	3	7
RT6913	*Akanthophoreus*	*gracilis*	Good; Medium	2	2
RT6914	*Rissoa*	*membranacea*	Good; Large, 8-10mm	0	0
RT6915	*Phyllodoce*	*groenlandica*	Fair, faded, proboscis out; Small	0	8
RT6916	*Eusyllis*	*blomstrandi*	Fair; Medium	4	4
RT6917	*Pseudosphyrapus*	*anomalus*	Good; Medium	0	3
RT6918	*Paradoneis*	*lyra*	Good; Medium	0	1
RT6919	*Palaemon*	*varians*	Good; Small, 5-8mm carapace length (with rostrum)	0	0
RT6920	*Thysanocardia*	*procera*	Fair; Medium	1	1
RT6921	*Pholoe*	*inornata*	Fair; Medium	0	2
RT6922	*Amphicorina*	*triangulata*	Good; Medium	3	8
RT6923	*Axinulus*	*croulinensis*	Good; Medium	2	2
RT6924	*Buccinum*	*undatum*	Fair; Small, 3-5mm	4	4
RT6925	*Leucothoe*	*incisa*	Good; Medium	0	1
			Total differences	25	57
			Average differences /lab.	1.5	3.4

Table 2. The identification of fauna made by participating laboratories for RT69 (arranged by specimen). Names are given only where different from the AQC identification.

	RT6901	RT6902	RT6903	RT6904	RT6905	RT6906	RT6907	RT6908	RT6909	RT6910	RT6911	RT6912
Taxon	***Timoclea ovata***	***Dasybranchus caducus***	***Parvicardium exiguum***	***Nucula sulcata***	***Westwoodilla caecula***	***Microdeutopus anomalus***	***Ceratocephale loveni***	***Idotea pelagica***	***Okenia nodosa***	***Caprella acanthifera***	***Nucella lapillus***	***Pleonexes gammaroides***
BI_3201	- -	- -	- -	- -	- -	- -	- -	- -	- -	Parvipalpus capillaceus	- -	Ampithoe rubricata
BI_3202	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3203	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3204	- -	- -	- -	- nucleus	- -	- -	- -	- -	- -	- -	- -	- helleri
BI_3206	- -	- -	- -	- nitidosa	- -	- -	- -	- -	- -	- -	Urosalpinx cinerea	- -
BI_3208	- -	- -	[Pavicardium] scabrum	- -	- -	- -	- -	- -	- -	Parvipalpus capillaceus	- -	- helleri
BI_3209	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3210	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3211	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3212	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3213	- -	- -	- -	- nitidosa	- -	- -	- -	- -	- -	- mutica	Buccinum undatum	Ampithoe ramondi
BI_3214a	- -	- -	- -	- -	- -	- -	- -	- -	- -	- mutica	- -	- helleri
BI_3214b	- -	- -	- -	- nucleus	- -	- -	- -	- -	- -	- mutica	- -	- -
BI_3215	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3216	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3217	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	Apohyale prevostii
BI_3220	- -	- -	- -	- -	- -	- -	- -	- -	Cadlina laevis	Parvipalpus capillaceus	- -	- helleri

Table 2 (cont.). The identification of fauna made by participating laboratories for RT69 (arranged by specimen). Names are given only where different from the AQC identification.

	RT6913	RT6914	RT6915	RT6916	RT6917	RT6918	RT6919	RT6920	RT6921	RT6922	RT6923	RT6924	RT6925
Taxon	***Akanthophoreus gracilis***	***Rissoa membranacea***	***Phyllodoce groenlandica***	***Eusyllis blomstrandi***	***Pseudosphyrapus anomalus***	***Paradoneis lyra***	***Palaemon varians***	***Thysanocardia procera***	***Pholoe inornata***	***Amphicorina triangulata***	***Axinulus croulinensis***	***Buccinum undatum***	***Leucothoe incisa***
BI_3201	- -	- -	- rosea	- -	- -	- -	- -	Golfingia vulgaris	- assimilis	- armandi	- -	Colus gracilis	- -
BI_3202	- -	- -	- rosea	- -	- -	- eliasoni	- -	- -	- -	- armandi	- -	- -	- -
BI_3203	- -	- -	- rosea	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3204	- -	- -	- rosea	Syllis gracilis	- -	- -	- -	- -	- -	Fabricia stellaris	- -	- -	- -
BI_3206	Tanaopsis graciloides	- -	- -	- -	- -	- -	- -	- -	- -	Fabricia stellaris	- -	- -	- lilljeborgi
BI_3208	- -	- -	- -	- -	- -	- -	- -	- -	- -	- armandi	- -	- -	- -
BI_3209	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3210	Leptognathiopsis attenuata	- -	- -	[Eusllis] -	- serratus	- -	- -	- -	- -	- -	- -	- -	- -
BI_3211	- -	- -	- -	- -	- serratus	- -	- -	- -	- -	- -	- -	Colus gracilis	- -
BI_3212	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3213	- -	- -	- rosea	Odontosyllis fulgurans	- serratus	- -	- -	- -	- [inornata (sensu Petersen)]	- armandi	- -	- -	- -
BI_3214a	- -	- -	- -	- -	- -	- -	- -	- -	- -	[Amphicornia] [triangularis]	- [crouliensis]	- -	- -
BI_3214b	[Parakanthophoreus] [longiremis]	- -	- mucosa?	Odontosyllis fulgurans	- -	- -	- -	- -	- baltica	- -	Genaxinus eumyarius	- -	- -
BI_3215	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3216	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
BI_3217	- -	- -	- rosea	Syllis pontxioi	- -	- -	- -	- -	- -	Fabricia stellaris	Thyasira obsoleta	Colus jeffreysianus	- -
BI_3220	- -	- -	- rosea	- -	- -	- -	- -	- -	- -	- pectinata	- -	Colus jeffreysianus	- -

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.

RT6901 – *Timoclea ovata* (Pennant, 1777) (Figure 1a)

Substratum: Diamicton. Salinity: Full (Euhaline). Depth: Circalittoral (Lower Shelf). Geography: North Sea. Condition: Good. Size: Small, 2-3mm. Specimens from three samples.

Fig. 1a. *Timoclea ovata* (RT6901; 12545, 75194) – L

No generic or specific differences recorded.

RT6902 – *Dasybranchus caducus* (Grube, 1846) (Figure 2a)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: western Scotland. Condition: Fair, thorax and abdomen. Size: Medium. Specimens from three samples.

Fig. 2a. *Dasybranchus caducus* (RT6902; 6907, 70111) – L

No generic or specific differences recorded.

RT6903 – *Parvicardium exiguum* (Gmelin, 1791) (Figure 3a)

Substratum: Diamicton. Salinity: Variable (Euryhaline). Depth: Infralittoral. Geography: Wales. Condition: Good. Size: Small, 2-4mm. Specimens from two samples.

Fig. 3a. *Parvicardium exiguum* (RT6903; 7508, 70945) – L

One specific difference: Lab 08 identified as *Parvicardium scabrum* (Figure 3b) (which has a less angular outline, more evenly distributed spines and more numerous radial ribs).

Fig. 3b. *Parvicardium scabrum* (412200, 37542) – L

RT6904 – *Nucula sulcata* Bronn, 1831 (Figure 4a)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Circalittoral (Lower Shelf). Geography: western approaches. Condition: Good. Size: Small, 2-3mm. Specimens from seven samples.

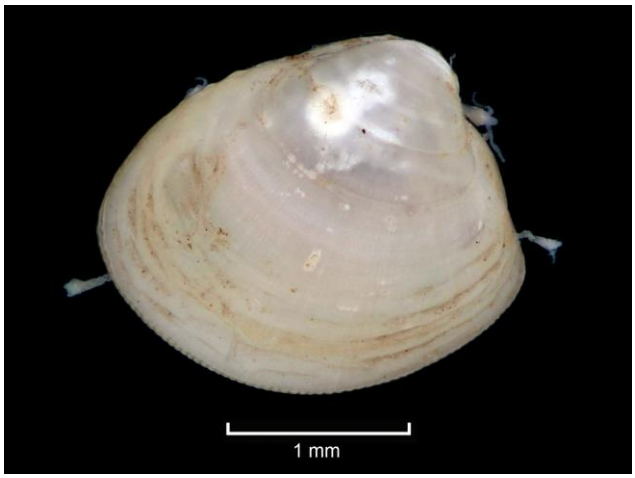


Fig. 4a. *Nucula sulcata* (RT6904; 6168, 67489) – L; (also hydrozoans: *Neoturris*)

Three specific differences: Labs 06 and 13 identified as *Nucula nitidosa* (Figure 4b); Labs 04 and 14b identified as *Nucula nucleus* (Figure 4c) (both of which have weaker concentric sculpture).

Lab 02 initially identified as *Linucula hartvigiana* (Dohrn, 1864), a New Zealand species but corrected to *N. sulcata*. A WoRMS nomenclature check for *Nucula sulcata* gives the name as accepted for the authority Bronn (1831) but returns *Linucula hartvigiana* if A. Adams (1856) is selected.

Fig. 4b. *Nucula nitidosa* (413975, 59491) – L

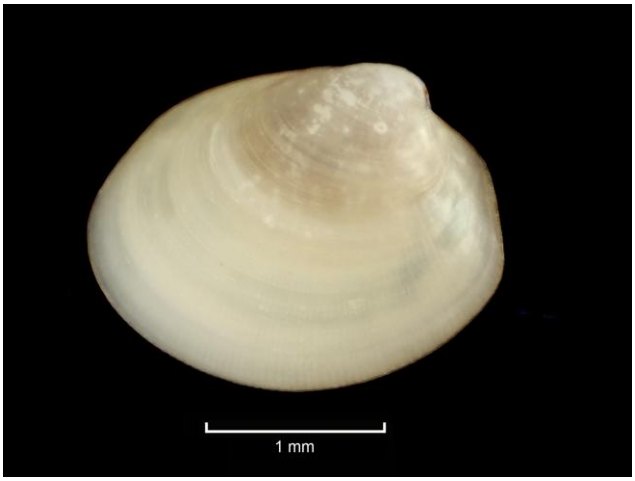


Fig. 4c. *Nucula nucleus* (413531, 43576) – L

RT6905 – *Westwoodilla caecula* (Spence Bate, 1857) (Figure 5a)

Substratum: Sand. Salinity: Full (Euhaline). Depth: Circalittoral (Lower Shelf). Geography: North Sea. Condition: Fair, at least one G1 & G2. Size: Medium. Sex: Female. Specimens from ten samples.

Fig. 5a. *Westwoodilla caecula* (RT6905; 13229, 75229) – L

No generic or specific differences recorded.

RT6906 – *Microdeutopus anomalus* (Rathke, 1843) (Figure 6a)

Substratum: Diamicton. Salinity: Variable (Euryhaline). Depth: Infralittoral. Geography: southeast England. Condition: Fair, at least one G1, no antennae. Size: Medium. Sex: Male. Specimens from two samples.

Fig. 6a. *Microdeutopus anomalus* (RT6906; 12690, 74788) – L

No generic or specific differences recorded.

RT6807 – *Ceratocephale loveni* Malmgren, 1867 (Figure 7a)

Substratum: Sand. Salinity: Full (Euhaline). Depth: Circalittoral (Lower Shelf). Geography: North Sea. Condition: Fair, proboscis not everted. Size: Small. Specimens from seven samples.

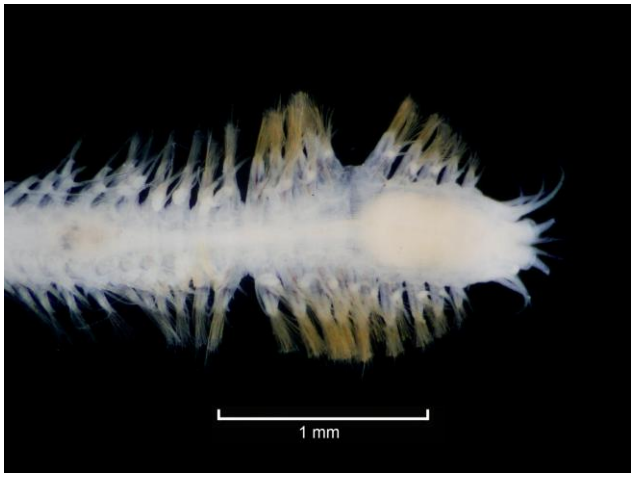


Fig. 7a. *Ceratocephale loveni* (RT6907; 4266, 64494) – D

No generic or specific differences recorded.

RT6908 – *Idotea pelagica* Leach, 1816 (Figure 8a)

Substratum: Floral turf. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: northern Scotland. Condition: Good. Size: Medium, 5-6mm. All specimens from one sample.

Fig. 8a. *Idotea pelagica* (RT6908; 2188.01, 61882) – D

No generic or specific differences recorded.

RT6909 – *Okenia nodosa* (Montagu, 1808) (Figures 9a, 9b)

Substratum: Diamicton. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: North Sea. Condition: Fair. Size: Small, 3-5mm. Specimens from two samples.

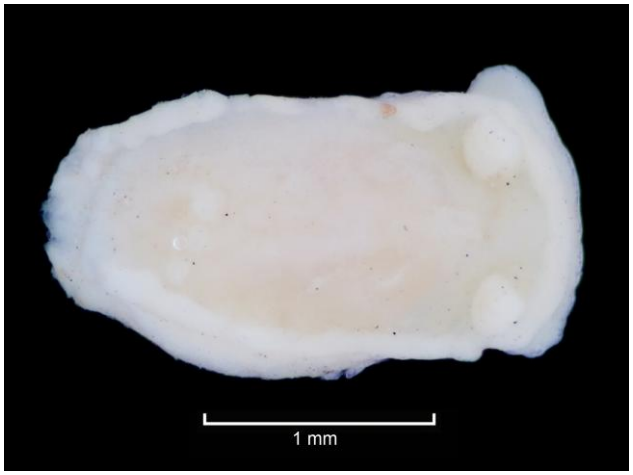


Fig. 9a. *Okenia nodosa* (RT6809; 12712, 74825) – D

One generic and specific difference: Lab 20 identified as *Cadlina laevis* (Figure 9c) (which has a wider mantle).

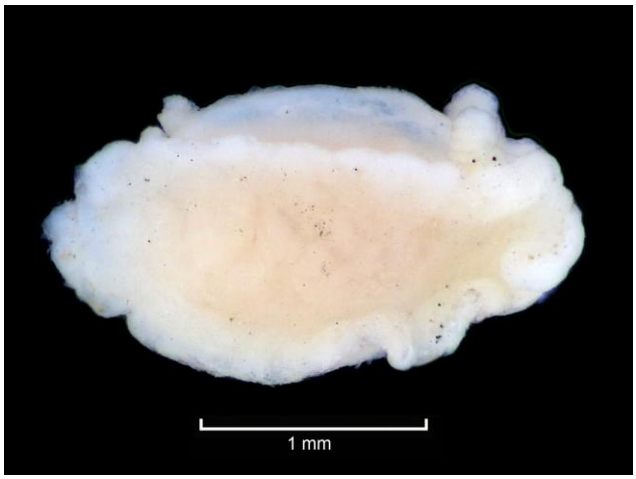


Fig. 9b. *Okenia nodosa* (RT6809; 12712, 74825) – L

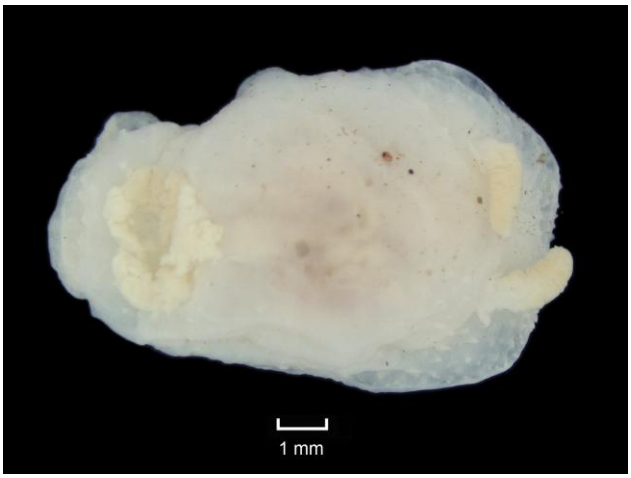


Fig. 9c. *Cadlina laevis* (P8811, 72684) – D

RT6910 – *Caprella acanthifera* Leach, 1814 (Figure 10a)

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

Fig. 10a. *Caprella acanthifera* (RT6910; 12254, Lough an Aibhnín 3) – L

Three generic and six specific differences: Labs 13, 14a and 14b identified as *Caprella mutica* (Figure 10b) (which has long setae on antenna 2); Labs 01, 08 and 20 identified as *Parvipalpus capillaceus* (Figure 10c) (which has a less angular dorsal margin to the head).

Fig. 10b. *Caprella mutica* (P529, 58340) – L

Fig. 10c. *Parvipalpus capillaceus* (P4162.1, 65237) – L

RT6911 – *Nucella lapillus* (Linnaeus, 1758) (Figure 11a)

Substratum: Hard substrata. Salinity: Full (Euhaline). Depth: Intertidal. Geography: southwest England. Condition: Good. Size: Medium, 20-30 mm. All specimens from one sample.

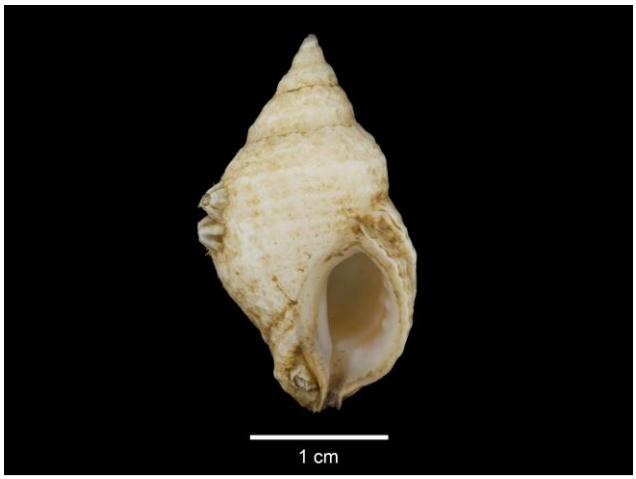


Fig. 11a. *Nucella lapillus* (RT6911; DH, Watchet) – V

Two generic and specific differences: Lab 13 identified as *Buccinum undatum* (Figures 11b, 24a, 24d-24i) (which has a thinner shell and more distinct sculpture); Lab 06 identified as *Urosalpinx cinerea* (Figure 11c) (which has distinct axial sculpture).

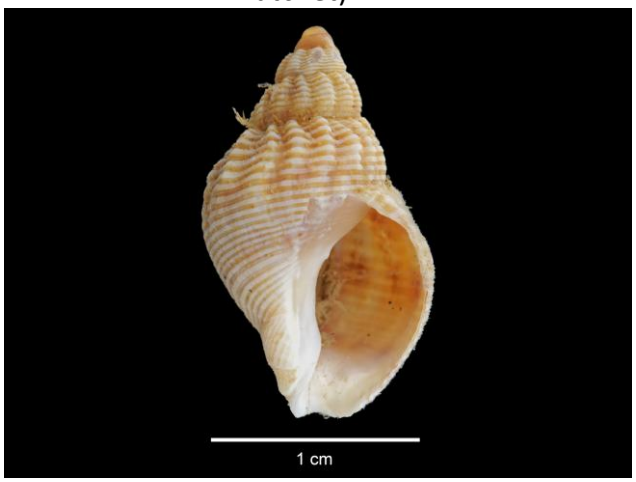


Fig. 11b. *Buccinum undatum* (413531, 56600) – V

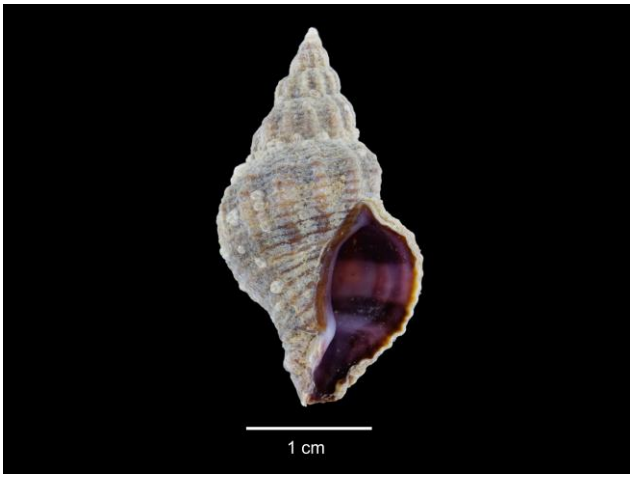


Fig. 11c. *Urosalpinx cinerea* (RT5707; TW, Whitstable) – V

RT6912 – *Pleonexes gammaroides* Spence Bate, 1857 (Figures 12a, 12f, 12h)

Substratum: Floral turf. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: northern Scotland. Condition: Good. Size: Small. Sex: Female. Specimens from four samples.

Fig. 12a. *Pleonexes gammaroides* (RT6912; 10597.02, 73435) – L

Three generic and seven specific differences: Lab 13 identified as *Ampithoe ramondi* (Figure 12b); Lab 01 identified as *Ampithoe rubricata* (Figures 12c, 12g) (both of which lack curved distal spines on the telson); Labs 04, 08, 14a and 20 identified as *Pleonexes helleri* (Figures 12d, 12i) (which lacks an anterodistal lobe on the ischium of gnathopod 2); Lab 17 identified as *Apohyale prevostii* (Figure 12e) (which has a short antenna 1).

Fig. 12b. *Ampithoe ramondi* (P6773, 70703) – L

Fig. 12c. *Ampithoe rubricata* (P13652.1, 75340) – L

Fig. 12d. *Pleonexes helleri* (412693, 7059) – L

Fig. 12e. *Apohyale prevostii* (P529, 58329) – L

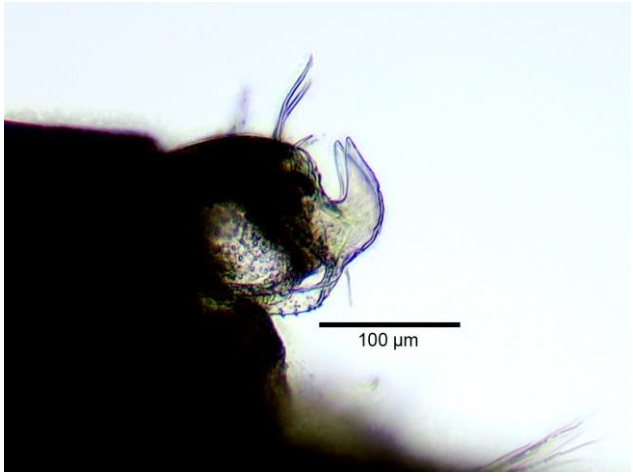


Fig. 12f. *Pleonexes gammaroides* (RT6912; 10597.02, 73435) – telson

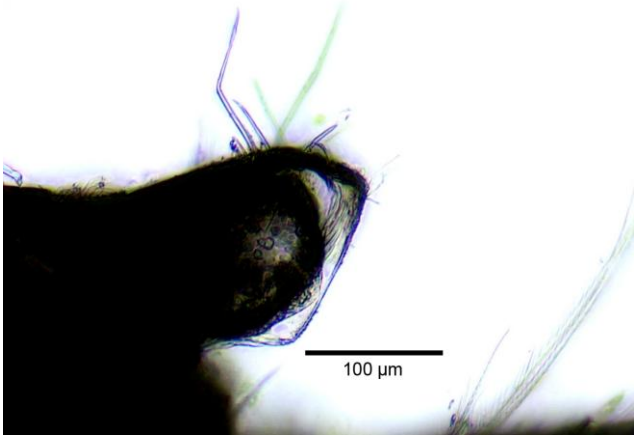


Fig. 12g. *Ampithoe rubricata* (P10597.1; 73237) – telson

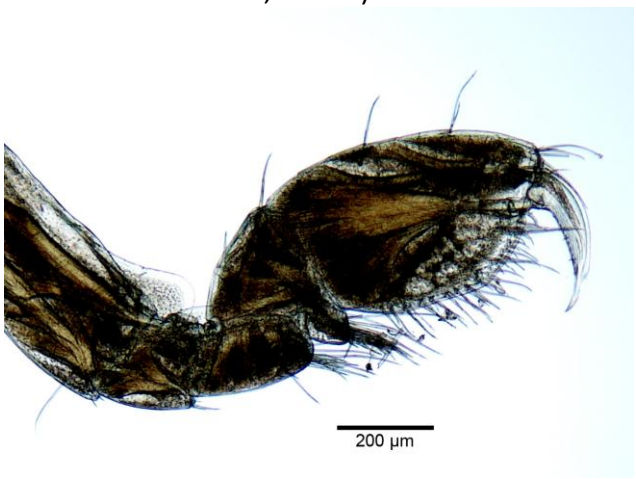


Fig. 12h. *Pleonexes gammaroides* (RT6912; 10597.02, 73435) – G2

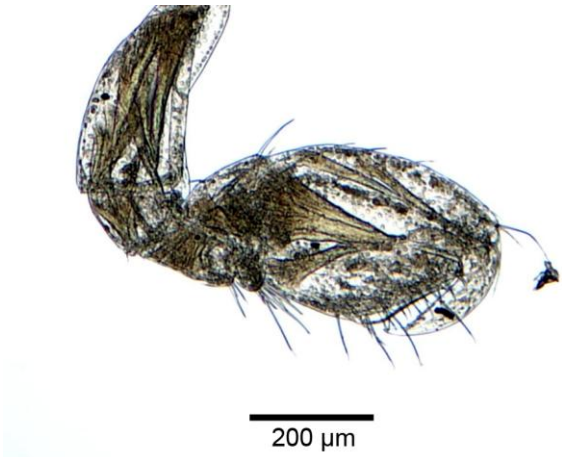


Fig. 12i. *Pleonexes helleri* (412693, 7059) – G2

RT6913 – '*Akanthophoreus gracilis*' (Krøyer, 1842) *sensu* Sars, 1899 (Figures 13a, 13b, 13c)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: north of Ireland. Condition: Good. Size: Medium. Specimens from two samples.

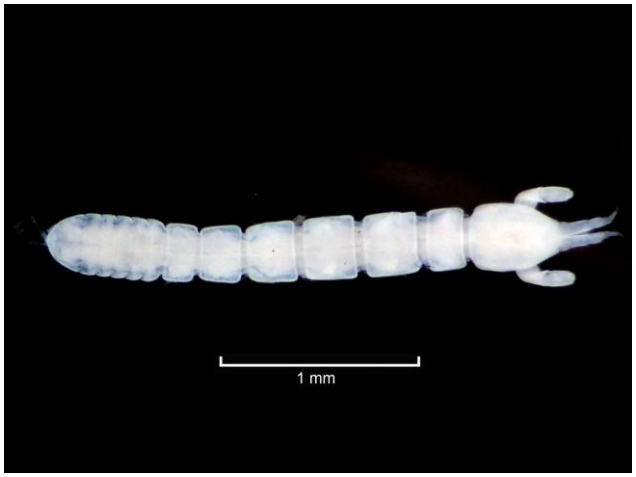


Fig. 13a. '*Akanthophoreus gracilis' sensu* Sars, 1899 (RT6913; 6808.1, 69383) – D

Two generic and specific differences: Lab 06 identified as *Tanaopsis graciloides* (Figures 13d, 13e) (which has a weakly calcified exoskeleton, paired teeth on the cheliped propodus and shorter uropods); Lab 10 identified as *Leptognathiopsis attenuata* (no material available) (which has single articled uropod exopodites).

Lab 14b identified as *Parakanthophoreus longiremis*, which has been accepted as correct for the purposes of this exercise (see below).

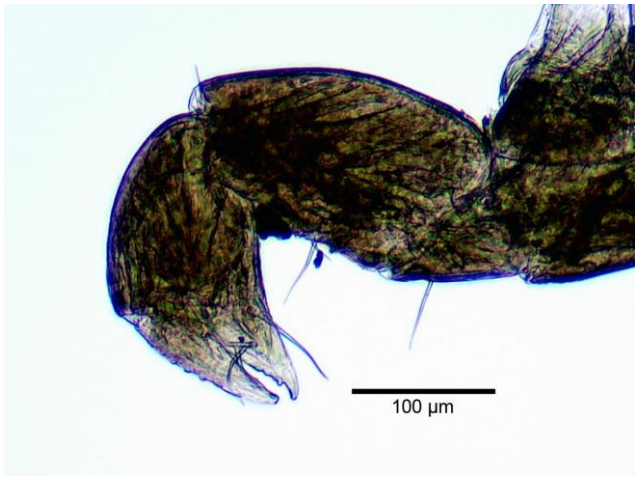


Fig. 13b. '*Akanthophoreus gracilis' sensu* Sars, 1899 (RT6913; 6808.1, 69383) – Cheliped

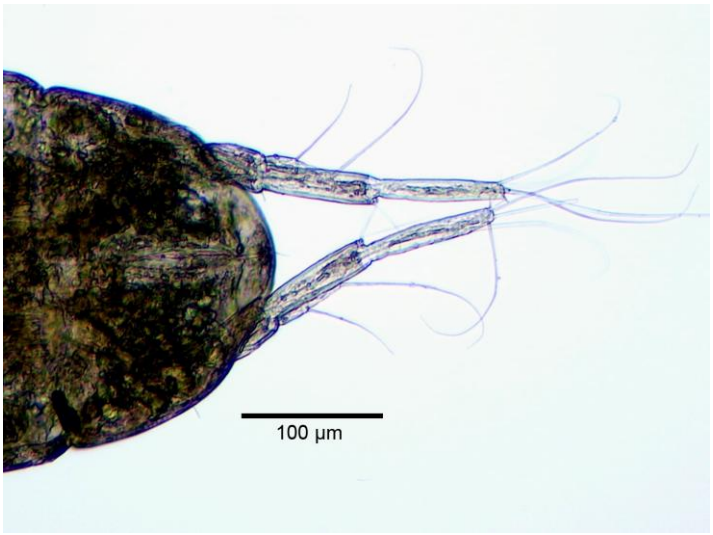


Fig. 13c. '*Akanthophoreus gracilis' sensu* Sars, 1899 (RT6913; 6808.1, 69383) – Uropods

Fig. 13d. *Tanaopsis graciloides* (RT6404; 4162.1, 65209) – D

Fig. 13e. *Tanaopsis graciloides* (P2258, 61002) – Uropods

RT6914 – *Rissoa membranacea* (J. Adams, 1800) (Figure 14a)

Substratum: Floral turf. Salinity: Reduced (Mesohaline). Depth: Infralittoral. Geography: western Ireland. Condition: Good. Size: Large, 8-10mm. All specimens from one sample.

Fig. 14a. *Rissoa membranacea* (RT6914; 12254, Lough an Aibhnín, 3) – V

No generic or specific differences recorded.

RT6915 – *Phyllodoce groenlandica* Örsted, 1842 (Figures 15a, 15d)

Substratum: Diamicton. Salinity: Full (Euhaline). Depth: Circalittoral (Lower Shelf). Geography: North Sea. Condition: Fair, faded, proboscis out. Size: Small. Specimens from five samples.

Fig. 15a. *Phyllodoce groenlandica* (RT6915; 413249, 8713) – D

Eight specific differences: Labs 01, 02, 03, 04, 13, 17 and 20 identified as *Phyllodoce rosea* (Figures 15b, 15e) (which has narrower ventral cirri); Lab 14b identified as *Phyllodoce mucosa* (Figures 15c, 15f) (which has more bluntly pointed ventral cirri).

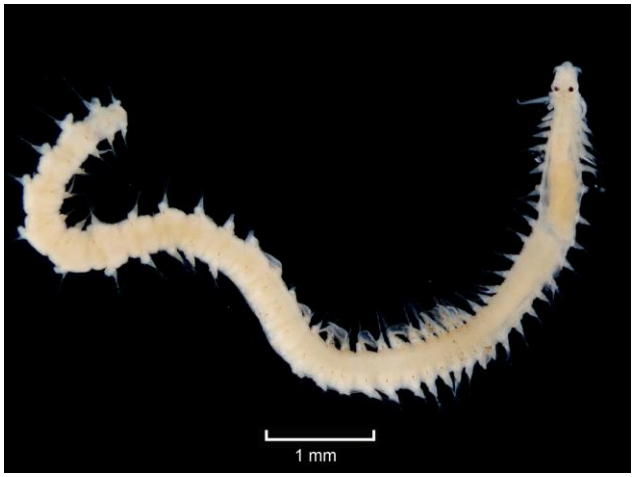


Fig. 15b. *Phyllodoce rosea* (P1223, 58211) – D

Fig. 15c. *Phyllodoce mucosa* (P12690, 74779) – D

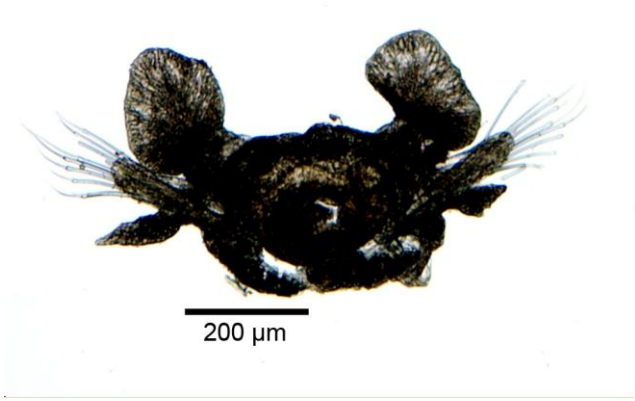


Fig. 15d. *Phyllodoce groenlandica* (RT6915; 413249, 8726) – parapodia

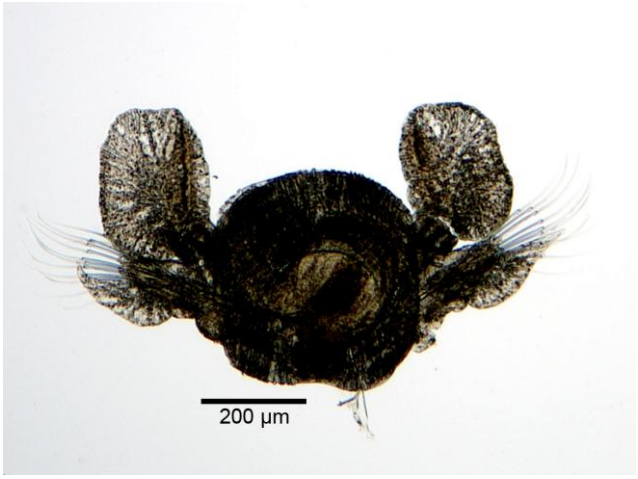


Fig. 15e. *Phyllodoce rosea* (P9615, 72805) – parapodia

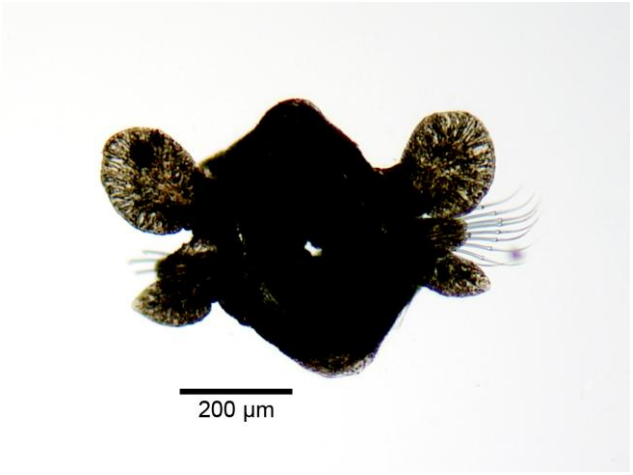


Fig. 15f. *Phyllodoce mucosa* (414120, 55222) – parapodia

RT6916 – *Eusyllis blomstrandi* Malmgren, 1867 (Figures 16a, 16e)

Substratum: Hard substrata. Salinity: Full (Euhaline). Depth: Infralittoral. Geography: northern Scotland. Condition: Fair. Size: Medium. Specimens from two samples.

Fig. 16a. *Eusyllis blomstrandi* (RT6916; 10597.01, 73238) – D

Four generic and specific differences: Labs 13 and 14b identified as *Odontosyllis fulgurans* (Figures 16b, 16f) (which has a longer and narrower dorsal flap); Lab 04 identified as *Syllis gracilis* (Figure 16c); Lab 17 identified as *Syllis pontxioi* (Figure 16d) (both of which have beaded dorsal cirri throughout and lack a dorsal flap).

Fig. 16b. *Odontosyllis fulgurans* (P4199, 67160) – D

Fig. 16c. *Syllis gracilis* (413557, 10524) – D

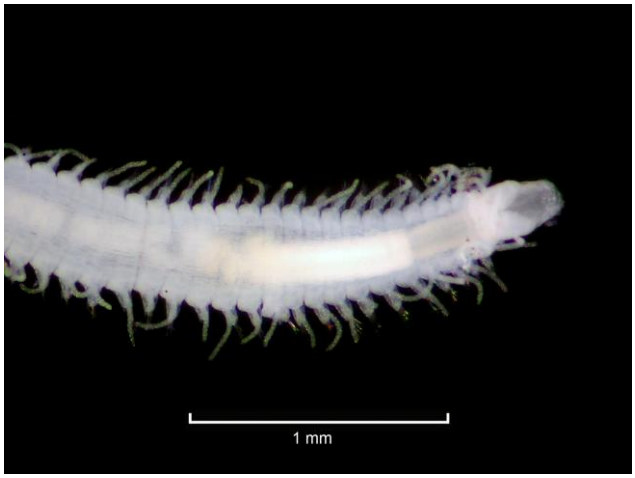


Fig. 16d. *Syllis pontxioi* (RT68 ; P9615, 72817) – D

Fig. 16e. *Eusyllis blomstrandi* (RT6916; 10597.01, 73238) – L

Fig. 16f. *Odontosyllis fulgurans* (P4199, 67160) – L

RT6917 – *Pseudosphyrapus anomalus* (Sars, 1869) (Figures 17a, 17b)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Bathyal. Geography: Atlantic margin. Condition: Good. Size: Medium. Sex: Female. Specimens from eleven samples.

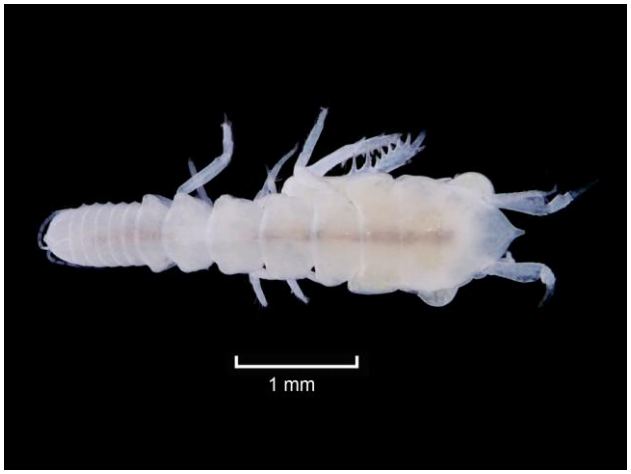


Fig. 17a. *Pseudosphyrapus anomalus* (RT6917; 15352, 77813) – D

Three specific differences: Labs 10, 11 and 13 identified as *Pseudosphyrapus serratus* (no material available) (which has more strongly projecting acute lateral projections on its pleon segments).

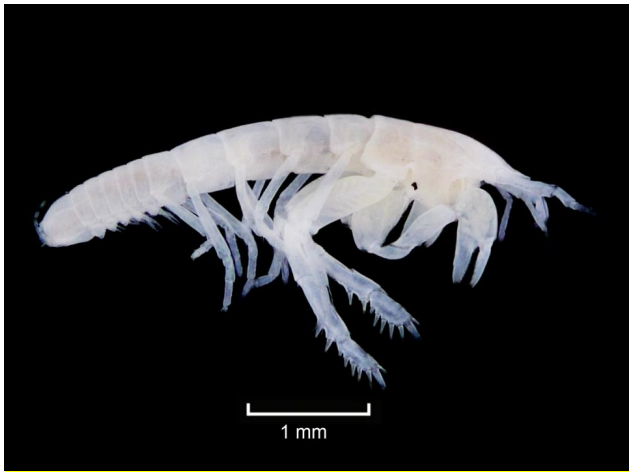


Fig. 17b. *Pseudosphyrapus anomalus* (RT6917; 15352, 77813) – L

RT6918 – *Paradoneis lyra* (Southern, 1914) (Figure 18a)

Substratum: Sand. Salinity: Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: southeast England. Condition: Good. Size: Medium. Specimens from eight samples.

Fig. 18a. *Paradoneis lyra* (RT6918; 413374, 9502) – L

One specific difference: Lab 02 identified as *Paradoneis eliasoni* (Figures 18b, 18c) (which has acicular chaetae in posterior neuropodia).

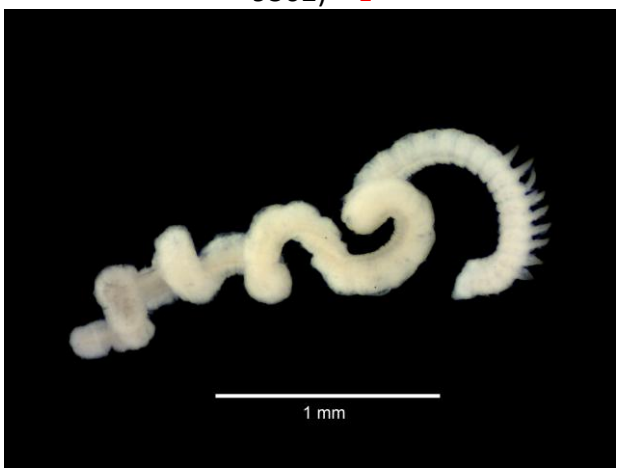


Fig. 18b. *Paradoneis eliasoni* (RT6115; P4264, 64137) – L

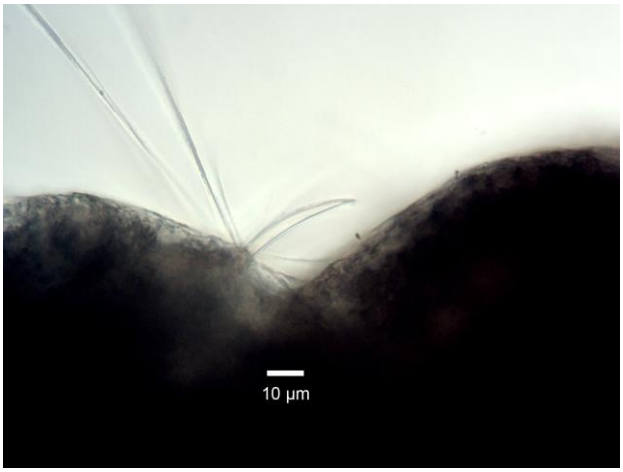


Fig. 18c. *Paradoneis eliasoni* (RT6115; P4264, 64137) – Posterior chaetae

RT6919 – *Palaemon varians* Leach, 1814 (Figure 19a)

Substratum: Floral turf. Salinity: Reduced (Mesohaline). Depth: Infralittoral. Geography: western Ireland. Condition: Good. Size: Small, 5-8mm carapace length (with rostrum). All specimens from one sample.

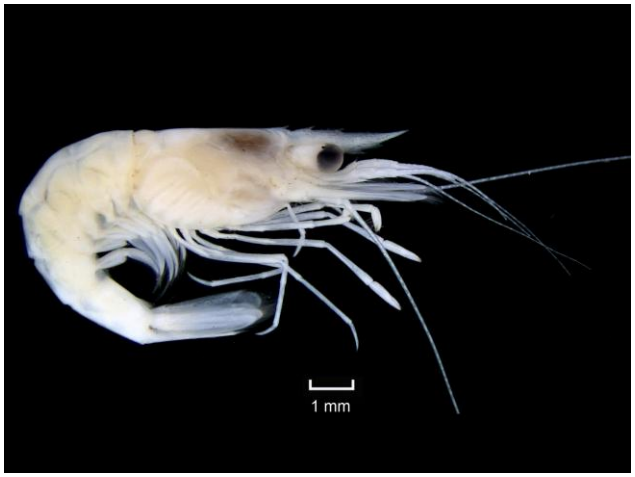


Fig. 19a. *Palaemon varians* (RT6919; 12254, Farranamanagh 2) – L

No generic or specific differences recorded.

RT6920 – *Thysanocardia procera* (Möbius, 1875) (Figure 20a, 20c)

Substratum: Mud. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: western Scotland. Condition: Fair. Size: Medium. Specimens from three samples.

Fig. 20a. *Thysanocardia procera* (RT6920; 10730, 73181) – L

One generic and specific difference: Lab 01 identified as *Golfingia vulgaris* (Figure 20b, 20d) (which has stronger papillations at the posterior end).

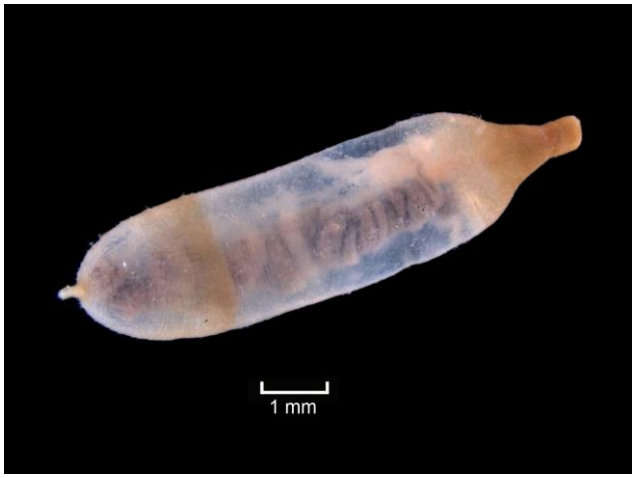


Fig. 20b. *Golfingia vulgaris* (P10478, 72846) – L

Fig. 20c. *Thysanocardia procera* (RT6920; 10730, 73181) – Posterior

Fig. 20b. *Golfingia vulgaris* (P10478, 72846) – Posterior

RT6921 – *Pholoe inornata* Johnston, 1839 (Figure 21a)

Substratum: Diamicton. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: southeast England. Condition: Fair. Size: Medium. All specimens from one sample.

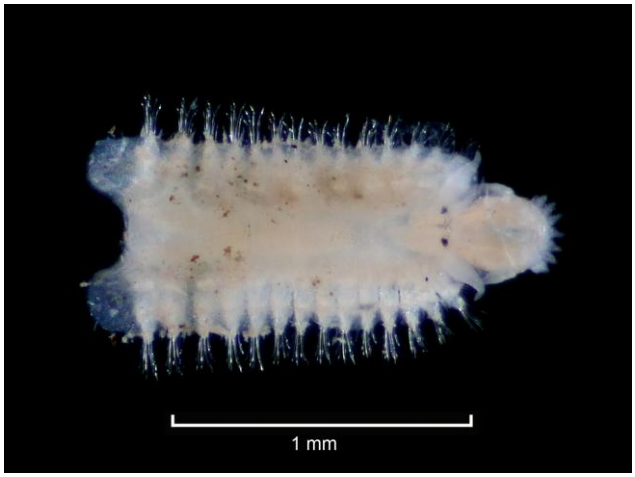


Fig. 21a. *Pholoe inornata* (RT6921; 414024, 54841) – D

Two generic and specific differences: Lab 14b identified as *Pholoe baltica* (Figure 21b) (which has shorter elytral papillae and a distinct facial tubercle); Lab 01 identified as *Pholoe assimilis* (Figure 21c) (which has shorter elytral papillae and lacks pigment between the eyespots).

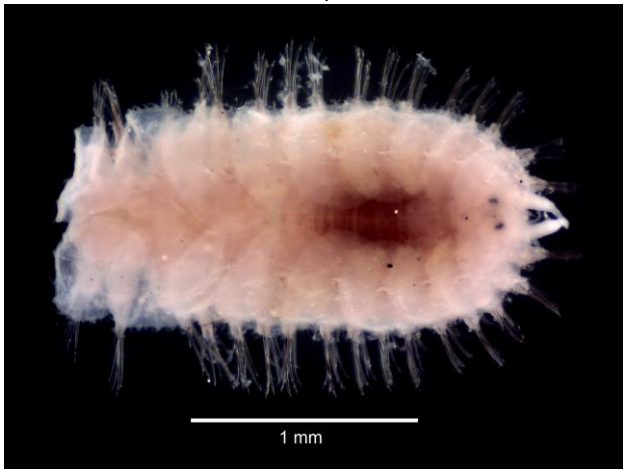


Fig. 21b. *Pholoe baltica* (RT5918; P1341, 58673) – D

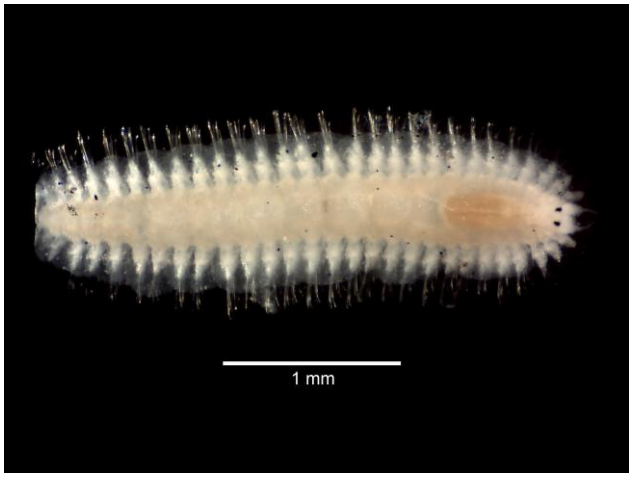


Fig. 21c. *Pholoe assimilis* (413646, 10782) – D

RT6922 – *Amphicorina triangulata* López & Tena, 1999 (Figures 22a, 22d)

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

Fig. 22a. *Amphicorina triangulata* (RT6922; 7323.01, 70415) – L

Three generic and eight specific differences: Labs 04, 06 and 17 identified as *Fabricia stellaris* (Figure 22b) (which has clear pygidial eyespots); Labs 01, 02, 08 and 13 identified as *Amphicorina armandi* (Figures 22c, 22e) (which has a well-developed collar); Lab 20 identified as *Amphicorina pectinata* (no material available) (which has two pairs of ventral radiolar appendages).

Labs 09, 10, 11, 12 and 20 noted that the specimens were outside the recorded range for the species.

Fig. 22b. *Fabricia stellaris* (RT6009; P529, 58331) – L

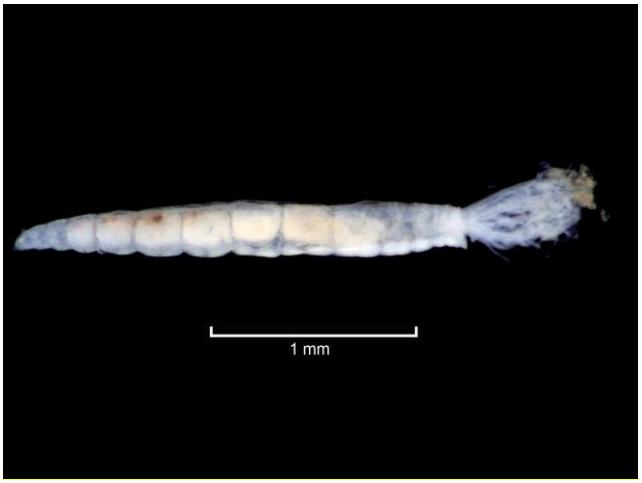


Fig. 22c. *Amphicorina armandi* (P2188.3, 63692) – L

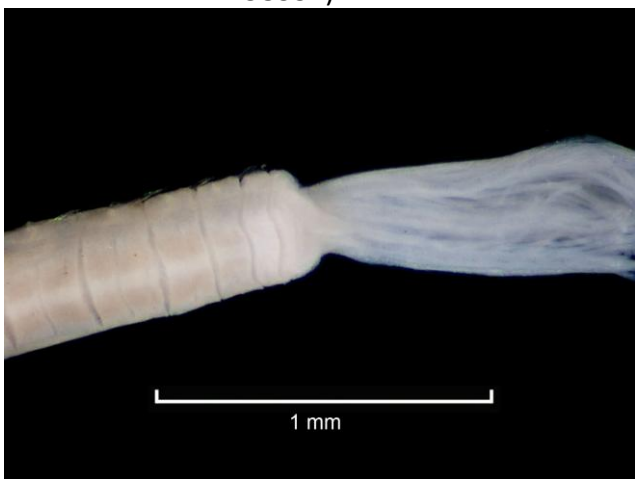


Fig. 22d. *Amphicorina triangulata* (RT6922; 7323.01, 70415) – V

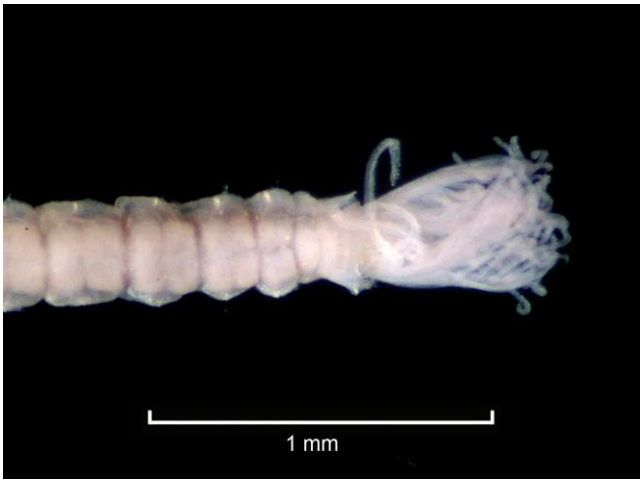


Fig. 22e. *Amphicorina armandi* (P10597.1, 73252) – V

RT6923 – *Axinulus croulinensis* (Jeffreys, 1847) (Figure 23a)

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

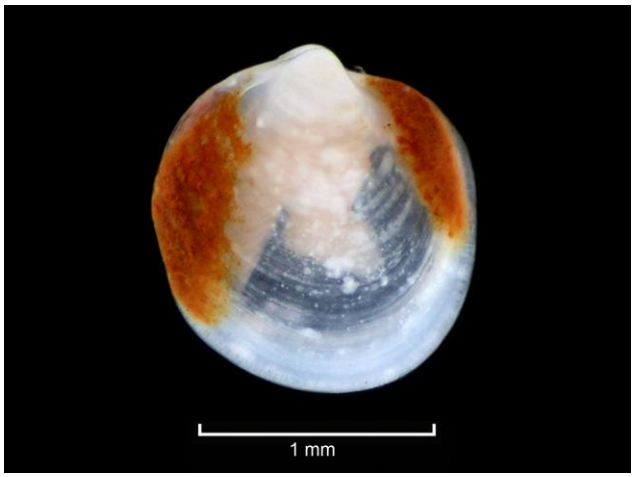


Fig. 23a. *Axinulus croulinensis* (RT6923; 134, VIL 4.4) – L

Two generic and specific differences: Lab 14b identified as *Genaxinus eumyarius* (Figure 23b) (which has internal white muscle scars, visible through the shell); Lab 17 identified as *Thyasira obsoleta* (Figure 23c) (which has a less equilateral shell).

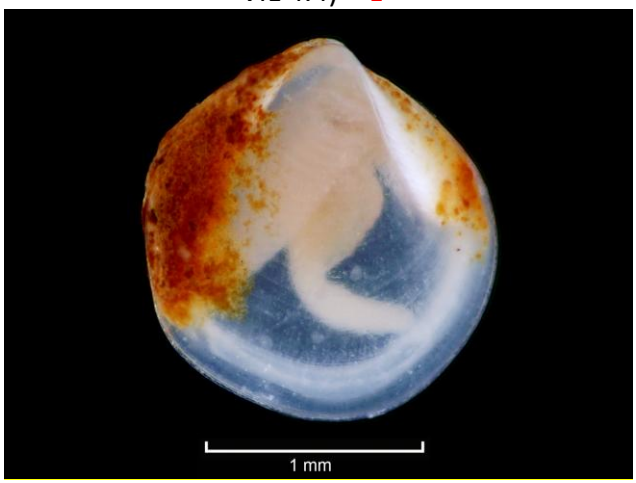


Fig. 23b. *Genaxinus* cf. *eumyarius* (P14525, 75935) – L

Fig. 23c. *Thyasira obsoleta* (P3183, 62428) – L

RT6924 – *Buccinum undatum* Linnaeus, 1758 (Figures 24a, 24d-24i)

Substratum: Diamicton. Salinity: Full (Euhaline). Depth: Circalittoral (Upper Shelf). Geography: southwest England. Condition: Fair. Size: Small, 3-5mm. All specimens from one sample.

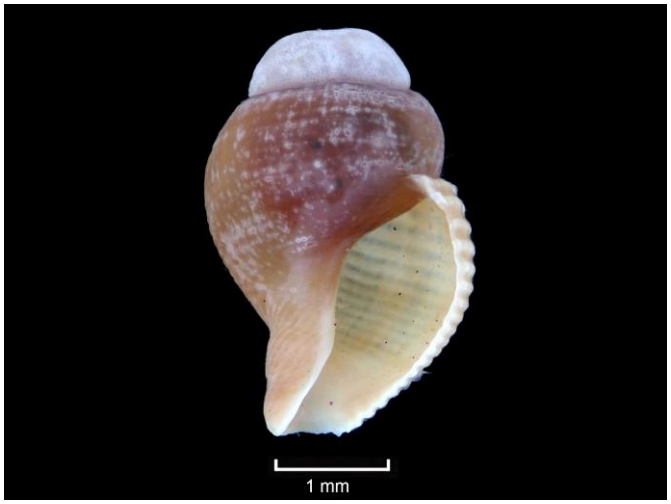


Fig. 24a. *Buccinum undatum* (RT6924; 412692,

Four generic and specific differences: Labs 01 and 11 identified as *Colus gracilis* (Figures 24b, 24c, 24j); Labs 17 and 20 identified as *Colus jeffreysianus* (Figure 24k) (both of which have a longer siphonal canal and paler shells at this size).

6896) – V

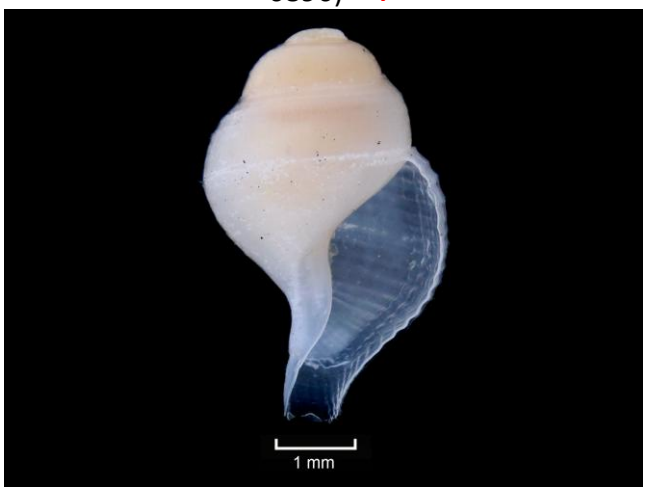


Fig. 24b. *Colus gracilis* (P5984.7, 71358) – V

Fig. 24c. *Colus gracilis* (P5984.13, 71621) – V

Fig. 24d. *Buccinum undatum* (P10478, 72865) – V

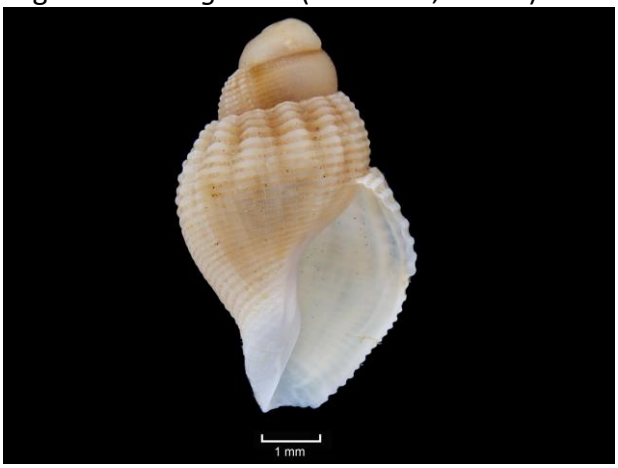


Fig. 24e. *Buccinum undatum* (413667, 43366) – V

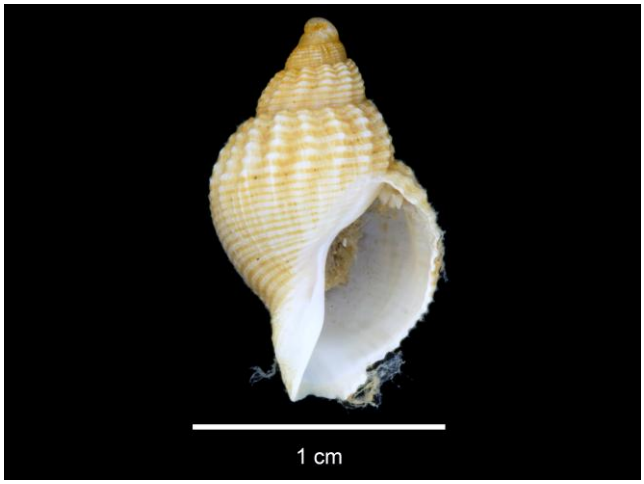


Fig. 24f. *Buccinum undatum* (P8364, 72243) – V

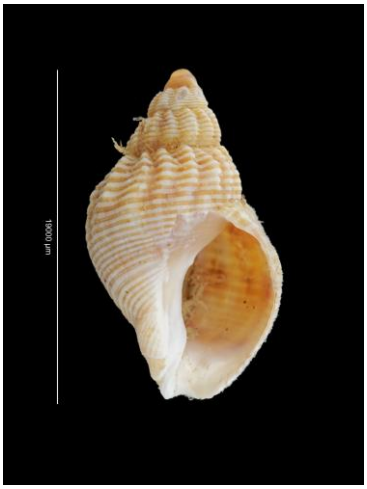


Fig. 24g. *Buccinum undatum* (413531, 56600) – V

Fig. 24h. *Buccinum undatum* (P2233.2, 64177) – V

Fig. 24i. *Buccinum undatum* (P6193, 70489) – V

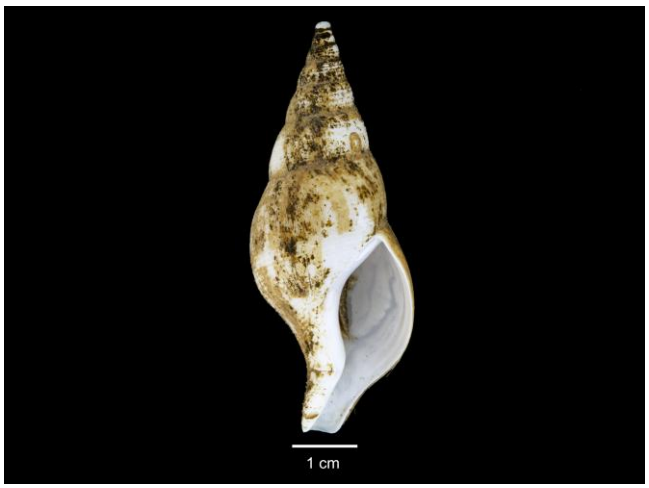


Fig. 24j. *Colus gracilis* (P9317, 74363) – V

Fig. 24k. *Colus jeffreysianus* (P2636, 62830) – V

RT6925 – *Leucothoe incisa* Robertson, 1892 (Figure 25a)

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

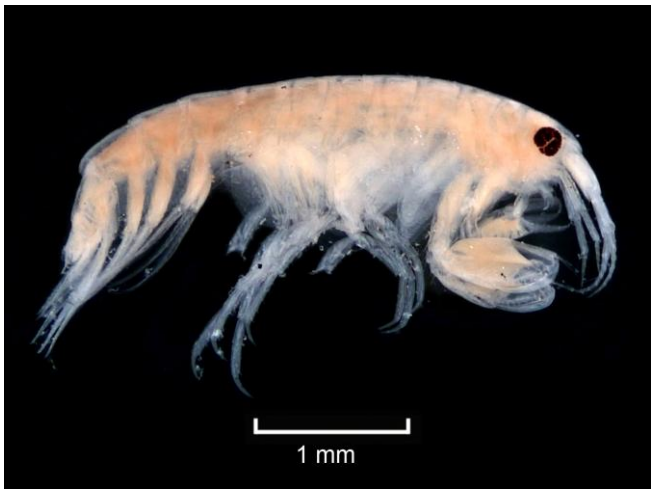


Fig. 25a. *Leucothoe incisa* (RT6925; 7508, 70886) – L

One generic and specific difference: Lab 06 identified as *Leucothoe lilljeborgi* (Figure 25b) (which has an acute projection to the anterodistal angle of coxal plate 4).

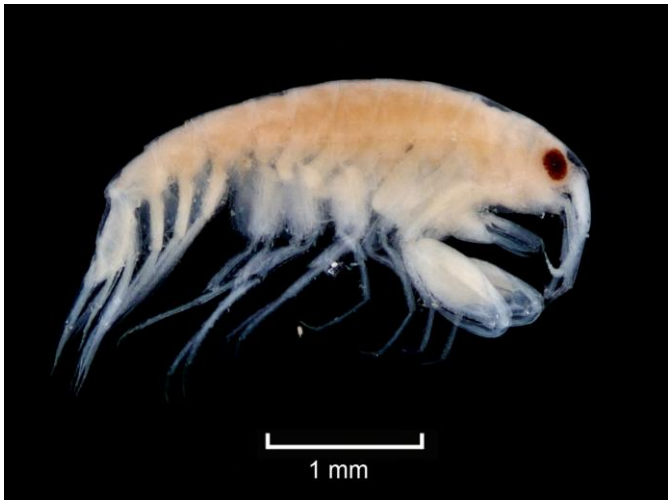


Fig. 25b. *Leucothoe lilljeborgi* (P12272_74249) – L

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.

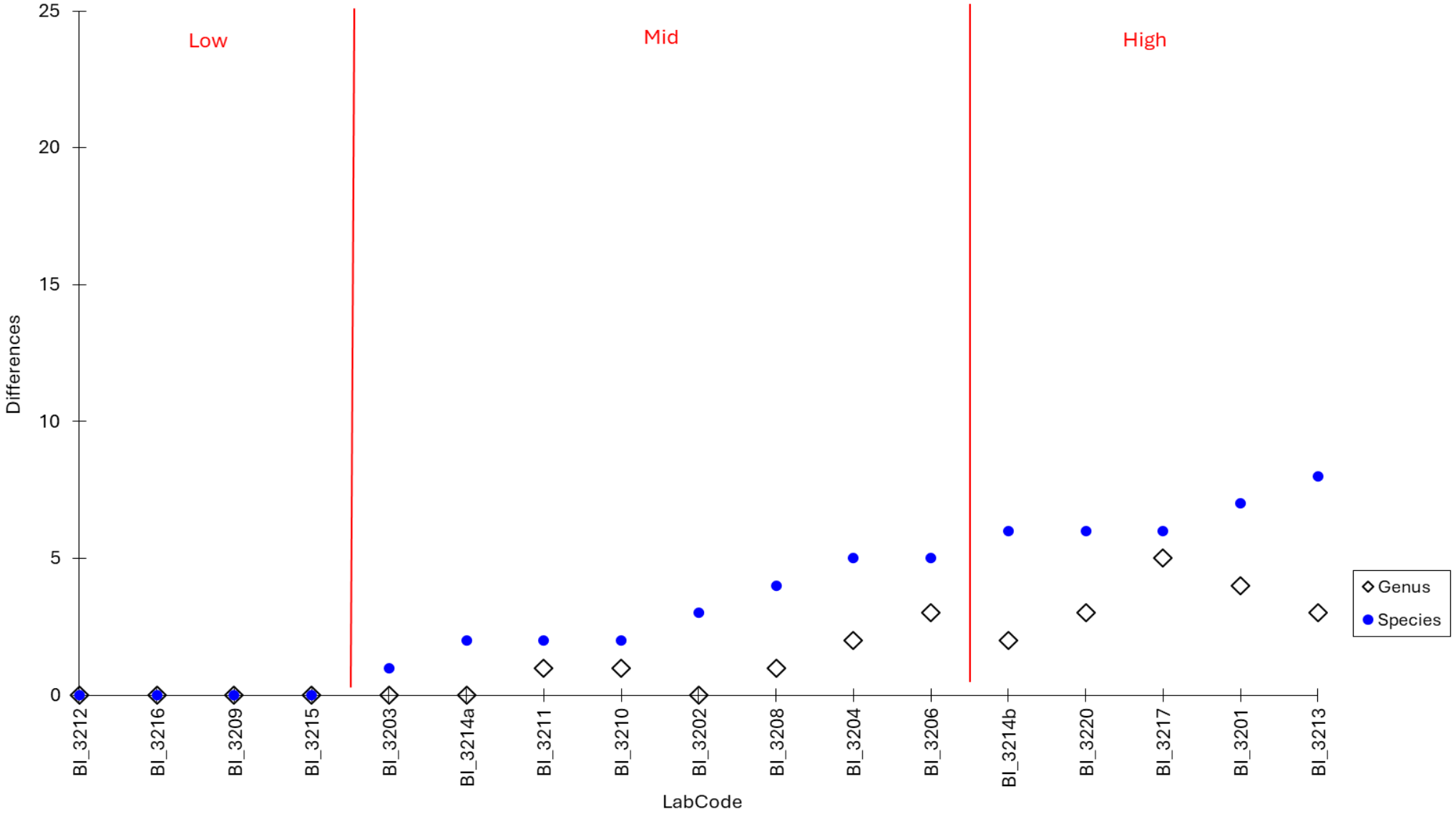
Table 3. The identification of fauna made by participating laboratories for RT69 (arranged by participant). Names are given only where different from the AQC identification.

	Taxon	BI_3201	BI_3202	BI_3203	BI_3204	BI_3206	BI_3208	BI_3209	BI_3210
RT6901	*Timoclea ovata*	- -	- -	- -	- -	- -	- -	- -	- -
RT6902	*Dasybranchus caducus*	- -	- -	- -	- -	- -	- -	- -	- -
RT6903	*Parvicardium exiguum*	- -	- -	- -	- -	- -	[Pavicardium] scabrum	- -	- -
RT6904	*Nucula sulcata*	- -	- -	- -	- nucleus	- nitidosa	- -	- -	- -
RT6905	*Westwoodilla caecula*	- -	- -	- -	- -	- -	- -	- -	- -
RT6906	*Microdeutopus anomalus*	- -	- -	- -	- -	- -	- -	- -	- -
RT6907	*Ceratocephale loveni*	- -	- -	- -	- -	- -	- -	- -	- -
RT6908	*Idotea pelagica*	- -	- -	- -	- -	- -	- -	- -	- -
RT6909	*Okenia nodosa*	- -	- -	- -	- -	- -	- -	- -	- -
RT6910	*Caprella acanthifera*	Parvipalpus capillaceus	- -	- -	- -	- -	Parvipalpus capillaceus	- -	- -
RT6911	*Nucella lapillus*	- -	- -	- -	- -	Urosalpinx cinerea	- -	- -	- -
RT6912	*Pleonexes gammaroides*	Ampithoe rubricata	- -	- -	- helleri	- -	- helleri	- -	- -
RT6913	*Akanthophoreus gracilis*	- -	- -	- -	- -	Tanaopsis graciloides	- -	- -	Leptognathiopsis attenuata
RT6914	*Rissoa membranacea*	- -	- -	- -	- -	- -	- -	- -	- -
RT6915	*Phyllodoce groenlandica*	- rosea	- rosea	- rosea	- rosea	- -	- -	- -	- -
RT6916	*Eusyllis blomstrandi*	- -	- -	- -	Syllis gracilis	- -	- -	- -	[Eusllis] -
RT6917	*Pseudosphyrapus anomalus*	- -	- -	- -	- -	- -	- -	- -	- serratus
RT6918	*Paradoneis lyra*	- -	- eliasoni	- -	- -	- -	- -	- -	- -
RT6919	*Palaemon varians*	- -	- -	- -	- -	- -	- -	- -	- -
RT6920	*Thysanocardia procera*	Golfingia vulgaris	- -	- -	- -	- -	- -	- -	- -
RT6921	*Pholoe inornata*	- assimilis	- -	- -	- -	- -	- -	- -	- -
RT6922	*Amphicorina triangulata*	- armandi	- armandi	- -	Fabricia stellaris	Fabricia stellaris	- armandi	- -	- -
RT6923	*Axinulus croulinensis*	- -	- -	- -	- -	- -	- -	- -	- -
RT6924	*Buccinum undatum*	Colus gracilis	- -	- -	- -	- -	- -	- -	- -
RT6925	*Leucothoe incisa*	- -	- -	- -	- -	- lilljeborgi	- -	- -	- -

Table 3 (cont.). The identification of fauna made by participating laboratories for RT69 (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	BI_3220
RT6901	*Timoclea ovata*	- -	- -	- -	- -	- -	- -	- -	- -	- -
RT6902	*Dasybranchus caducus*	- -	- -	- -	- -	- -	- -	- -	- -	- -
RT6903	*Parvicardium exiguum*	- -	- -	- -	- -	- -	- -	- -	- -	- -
RT6904	*Nucula sulcata*	- -	- -	- nitidosa	- -	- nucleus	- -	- -	- -	- -
RT6905	*Westwoodilla caecula*	- -	- -	- -	- -	- -	- -	- -	- -	- -
RT6906	*Microdeutopus anomalus*	- -	- -	- -	- -	- -	- -	- -	- -	- -
RT6907	*Ceratocephale loveni*	- -	- -	- -	- -	- -	- -	- -	- -	- -
RT6908	*Idotea pelagica*	- -	- -	- -	- -	- -	- -	- -	- -	- -
RT6909	*Okenia nodosa*	- -	- -	- -	- -	- -	- -	- -	- -	Cadlina laevis
RT6910	*Caprella acanthifera*	- -	- -	- mutica	- mutica	- mutica	- -	- -	- -	Parvipalpus capillaceus
RT6911	*Nucella lapillus*	- -	- -	Buccinum undatum	- -	- -	- -	- -	- -	- -
RT6912	*Pleonexes gammaroides*	- -	- -	Ampithoe ramondi	- helleri	- -	- -	- -	Apohyale prevostii	- helleri
RT6913	*Akanthophoreus gracilis*	- -	- -	- -	- -	[Parakanthophoreus] [longiremis]	- -	- -	- -	- -
RT6914	*Rissoa membranacea*	- -	- -	- -	- -	- -	- -	- -	- -	- -
RT6915	*Phyllodoce groenlandica*	- -	- -	- rosea	- -	- mucosa?	- -	- -	- rosea	- rosea
RT6916	*Eusyllis blomstrandi*	- -	- -	Odontosyllis fulgurans	- -	Odontosyllis fulgurans	- -	- -	Syllis pontxioi	- -
RT6917	*Pseudosphyrapus anomalus*	- serratus	- -	- serratus	- -	- -	- -	- -	- -	- -
RT6918	*Paradoneis lyra*	- -	- -	- -	- -	- -	- -	- -	- -	- -
RT6919	*Palaemon varians*	- -	- -	- -	- -	- -	- -	- -	- -	- -
RT6920	*Thysanocardia procera*	- -	- -	- -	- -	- -	- -	- -	- -	- -
RT6921	*Pholoe inornata*	- -	- -	- [inornata (sensu Petersen)]	- -	- baltica	- -	- -	- -	- -
RT6922	*Amphicorina triangulata*	- -	- -	- armandi	[Amphicornia] [triangularis]	- -	- -	- -	Fabricia stellaris	- pectinata
RT6923	*Axinulus croulinensis*	- -	- -	- -	- [croulinensis]	Genaxinus eumyarius	- -	- -	Thyasira obsoleta	- -
RT6924	*Buccinum undatum*	Colus gracilis	- -	- -	- -	- -	- -	- -	Colus jeffreysianus	Colus jeffreysianus
RT6925	*Leucothoe incisa*	- -	- -	- -	- -	- -	- -	- -	- -	- -

Figure 26. The number of differences from the AQC identification of specimens distributed in RT69 for each of the participating laboratories. Arranged in order of increasing number of differences (by specific followed by generic errors).



Taxonomic and Identification policy considerations highlighted by RT69

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 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 are included on included species 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. 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.

Annelida

Sigalionidae (RT6921). The draft TDP flags Sigalionidae for further work, due to taxonomic flux (changes in species recognised over time) and the different taxonomic levels used for different taxa by different labs, particularly for juveniles. The family. now includes taxa previously included in Pisionidae and Pholoidae. The details below cover only the subfamily **Pholoinae** (formerly Pholoidae). The draft TDP suggests species level identification for Pholoinae (in practice all are *Pholoe* in UK shelf waters), as currently done at APEM. The SD lists four *Pholoe*; MSBIAS lists six. It is now well-known that *Pholoe* identified using Chambers & Muir (1997), and nomenclature from the SD, will be given names that conflict with current understanding, as resolved by Petersen (1998) and Meißner et al. (2019). As the name '*Pholoe inornata*' has been used for both of the most common species at different times (a particular problem, see Worsfold *et al*., 2023), APEM add 'sensu Petersen' to *Pholoe* species names for clarity. Hebog and Thomson Ecology no longer do this, as the years of confusion have passed. One of the MSBIAS species (*P. minuta*) is restricted to Arctic waters (see Meißner et al., 2017) and another (*P. anoculata*) to deep water (Hartman & Fauchald, 1971). ***Pholoe inornata*** was circulated in 1995 (RT0621, as *P. synophthalmica*) with 30% error, 1999 (RT1420, as *P. synophthalmica*) with 17% error, 2001 (RT1804) with 8% error, 2007 (RT3213) with 13% error and 2025 **(RT6921)**. Most labs identified **RT6921** correctly (12% error), suggesting no need for change. Further discussion is needed for a solution to the wider problem of names that become applied to different species.

Chambers, S.J. & Muir, A.I., 1997. *Polychaetes: British Chrysopetaloidea, Pisionoidea & Aphroditoidea*. *Keys and notes for the identification of the species*. Synopses of the British Fauna

(New Series), No. 54. Published for the Linnaean Society of London and The Estuarine and Coastal Sciences Association by Field Studies Council, Shrewsbury, 202 pp.

Hartman, O. & Fauchald, K., 1971. Deep-water benthic polychaetous annelids off New England to Bermuda and other North Atlantic Areas. Part II. *Allan Hancock Monographs in Marine Biology*, 6, 1-327.

Meißner, K., Bick, A. & Götting, M., 2017. Arctic *Pholoe* (Polychaeta, Pholoidae): when integrative taxonomy helps to sort out barcodes. *Zoological Journal of the Linnean Society*, 179, 237-262.

Meißner, K., Götting, M. & Nygren, A., 2019. Do we know who they are? On the identity of *Pholoe* (Annelida: Sigalionidae: Pholoinae) species from northern Europe. *Zoological Journal of the Linnean Society*, 189(1), 178-206.

Petersen, M.E., 1998. *Pholoe* (Polychaeta: Pholoidae) from northern Europe: a key and notes on the nearshore species. *Journal of the Marine Biological Association of the United Kingdom*, 78(4), 1373-1376.

Phyllodocidae (RT6915). There have been several problems with Phyllodocids and the family will need to be revisited. The details below cover only the genus circulated in RT69: *Phyllodoce*. *Phyllodoce* are identified at species level at APEM (and Fugro), without separation of juveniles. The SD listed *P. laminosa* and three others (*P. lamelligera*, *P. macropapillosa*, *P. macrophthalma*, noted as probable synonyms of other species) in *Phyllodoce* and seven species of *Anaitides*. The standard identification guides (Pleijel, 1993; Pleijel & Dales, 1991) had included all eight species (without the three probable synonyms) in *Phyllodoce*. Pleijel (1993) notes that European *P. cf. longipes* (true *P. longipes* is from Chile) may represent *P. macropapillosa* or *P. jeffreysii* but did not resolve the problem. MSBIAS lists eleven *Phyllodoce*: the eight recognised in the standard guides (including *longipes*), plus *P. lamelligera*, *P. macropapillosa* and *P. schmardaei* (the last, a South African species, with *P. macrophthalma* listed as synonym). All problematic names were last edited in 2008, other than *P. lamelligera* (2016). *P. jeffreysii* has a British type locality and is accepted on WoRMS but not included in MSBIAS. ***Phyllodoce groenlandica*** (Arctic type locality) may also be a different species in temperate Europe but this is also unresolved. It was circulated in 2014 (RT4718), with 50% error and 2025 (**RT6915**). About half of the returns identified **RT6815** correctly (47% error), with most errors as P. rosea, which the small, faded specimens closely resembled.

Pleijel, F., 1993. *Polychaeta Phyllodocidae*. Marine Invertebrates of Scandinavia, 8, Scandinavian University Press, 159pp.

Pleijel, F. & Dales, R.P., 1991. *Polychaetes - British phyllodocoideans, typhloscolecoideans and tomopteroideans. Keys and notes for the identification of the species*. Synopses of the British Fauna (New Series), No. 45. Published for The Linnean Society of London and The Estuarine and Coastal Sciences Association by Universal Book Services/Dr. W. Backhuys, Oegstgeest, The Netherlands, 202pp.

Syllidae (RT6916). The draft TDP flags this large family for further work, due to taxonomic flux (changes in species recognised over time) and the different taxonomic levels used for different taxa by different labs. Some problems were resolved through the Scheme workshops (2006, 2012), as well as through RT48, but problems remain and more work is needed. Before the NMBAQC Scheme workshops, syllids were identified using older workshop keys (Garwood, 1985; 1990), updated after the 2006 workshop (Garwood, 2006) and 2012 workshop (San Martín & Worsfold, 2015); these guides are available on the Scheme website (links in citations below). There has

always been a need to refer also to other publications (especially San Martín, 2003) for additional species and illustrations. The details below cover only the genus circulated in RT69: *Eusyllis*. APEM identify *Eusyllis* to species but problems may remain. The SD and MSBIAS list four species, of which *E. intermedia* Saint-Joseph, 1887 is given as *Nomina dubia* in the revision by Brusa et al. (2013). Only three species are given in recent guides, of which *E. lamelligera* is distinctive. Chaetal blades are used to distinguish *E. blomstrandi* from *E. assimilis* in the most recent guides (San Martín, 2003, San Martín & Worsfold, 2015), whereas previously (Garwood, 2006), the presence of an occipital flap was used to distinguish *E. blomstrandi*. The flap is clear in most British *Eusyllis* specimens but not mentioned by Brusa et al. (2013), or drawn by San Martín (2003), although mentioned and shown in the SEM for *E. assimilis* (no SEM given for *E. blomstrandi*). Fauvel (1923) describes a flap for *E. blomstrandi* but does not use the feature in the key. More research is needed to determine correlations between occipital flaps and chaetal blade differences for *Eusyllis*. ***Eusyllis blomstrandi*** was circulated in 1998 (RT1107), with 16% error, 2002 (RT2004), with 27% error, 2004 (RT2425), without error, 2013 (RT4412), with 26% error and 2025 (**RT6916**). Most labs identified **RT6916** (which had an occipital flap and chaetal blades of similar length) correctly (24% error).

Brusa, V.S., Aguado, M.T., San Martín, G. & Rouse, G., 2013. Revision of the genus *Eusyllis* Malmgren, 1867 (Annelida: Phyllodocida: Syllidae: Eusyllinae), with the description of a new species from the eastern Pacific Ocean. *Zootaxa*, 3599(1), 37-50. http://zoobank.org/urn:lsid:zoobank.org:pub:6886E9E2-B45A-4F0C-8F79-3EBA5EC74DC9

Fauvel, P., 1923. *Polychetes errantes*. Faune de France 5, Lechevalier, Paris. 488pp.

Garwood P.R., 1985. *Family Syllidae*. EBWSA Errant Polychaete Workshop, Heriot-Watt University, Edinburgh, 1985, 25pp., (unpublished). https://www.nmbaqcs.org/scheme-components/invertebrates/literature-and-taxonomic-keys/garwood-1985-syllidae/

Garwood P.R., 1990. *Family Syllidae*. ECSA Polychaete Workshop, Fort Popton, April 1990, 15 pp., (unpublished). https://www.nmbaqcs.org/scheme-components/invertebrates/literature-and-taxonomic-keys/garwood-1990-syllidae/

Garwood, P.R., 2006. *Family Syllidae. Provisional guide to the identification of British species*. NMBAQC Taxonomic Workshop, Dove Marine Lab., Nov. 2006, 34pp., (unpublished). https://www.nmbaqcs.org/scheme-components/invertebrates/literature-and-taxonomic-keys/garwood-2006-syllidae/

San Martín, G., 2003. *Annelida, Polychaeta II: Syllidae*. In: *Fauna Ibérica*, 21. Ramos, M.A. et al. (Eds). Museo Nacional de Ciencias Naturales. CSIC. Madrid, 554 pp.

San Martín, G. & Worsfold, T.M., 2015. Guide and keys for the identification of Syllidae (Annelida, Phyllodocida) from the British Isles (reported and expected species). *ZooKeys*, 488, 1-29. https://zookeys.pensoft.net/articles.php?id=4917

Nereididae (RT6907). The draft TDP flags Nereididae for further work, due to different taxonomic levels currently used for different taxa by different labs, particularly for small specimens. APEM identify most to species, without separation of juveniles but occasional specimens are left at family level, if particularly small. Multiple literature resources are needed for nereid identification and there have been taxonomic updates and new records for many areas. ***Ceratocephale loveni*** was first circulated in 2025 (**RT6907**). All labs identified **RT6807** correctly (0% error).

Paraonidae (RT6918). The draft TDP suggests species identifications for paraonids, as currently done at APEM, although there are sometimes specimens that need qualification as there may still be some taxonomic flux. ***Paradoneis lyra*** was circulated in 1998 (RT1218), with 6% error, 2003 (RT2203), with 6% error and 2025 (**RT6918**). Most labs identified **RT6918** correctly (6% error). Discussion may be needed for taxonomically uncertain specimens.

Capitellidae (RT6902). The draft TDP flags Capitellidae for further work, due to taxonomic flux and different taxonomic levels currently used for different taxa by different labs, for some genera. APEM (and Fugro) identify most, including *Dasybranchus*, at genus level; species level for monotypic (in northern Europe) genera. The SD and MSBIAS both include two species. They can be separated using Capacciano-Azzati *et al*. (2015) and Tebble (1954). *Dasybranchus caducus* was first circulated in 2025 (**RT6902**). All labs identified **RT6902** correctly (0% error), suggesting species level might be achievable. Labs 09, 11, 12, 13 stated they would leave at genus.

Capacciano-Azzati, R. & El-Haddad, M., 2015. *Familia Capitellidae* Grube, 1862. In: Parapar, J., Moreira, J., Núñez, J., Barnich, R., Brito, M. del C., Fiege, D, Capacciano-Azzati, R. & El-Haddad, M. *Annelida Polychaeta IV*. *Fauna Ibérica*, 41. Ramos M.A. et al. (Eds). Museo Nacional de Ciencias Naturales. CSIC. Madrid, 257-352.

Tebble, N., 1954. On the polychaete *Dasybranchus caducus* (Capitellidae) from British Waters. *Annals and Magazine of Natural History*, *(Series 12)*, 7, 316-321.

Golfingiidae (RT6920). The draft TDP flags Golfingiidae for further work, due to taxonomic flux and different taxonomic levels currently used for different taxa by different labs, particularly for juveniles. APEM identify most at species level, without separation of juveniles, using texture differences, with dissection only for larger specimens. The family belongs to the taxon Sipuncula, which was considered a phylum until phylogenetic analyses placed them within Annelida from the early 2000s, which was not universally accepted until recently (Schulze & Kawauchi, 2021). They are now considered an order of Annelida but Rouse et al. (2022) place them in a clade with Amphinomida, while WoRMS currently retains Amphinomida within Errantia. The former sipunculan orders have been abandoned but the five families listed in the SD are retained in WoRMS, except that Phascolionidae are now included within Golfingiidae. The three golfingiid (and two phascolionid genera) listed in the SD are also retained in WoRMS. The standard guide (Gibbs, 2001) can now be supplemented with expanded literature, as listed in the Scheme's literature list. ***Thysanocardia procera*** was circulated in 2006 (RT2704), with 20% error and in 2025 (**RT6920**). Most labs identified **RT6920** correctly (6% error).

Gibbs, P.E., 2001. *British sipunculans. Keys and notes for the identification of the species*. Synopses of the British Fauna (New Series), No. 12. (Second Edition.) Published for The Linnean Society of London and The Estuarine and Coastal Sciences Association by Field Studies Council, Shrewsbury, 46 pp.

Schulze, A. & Kawauchi, G.Y., 2021. How many sipunculan species are hiding in our oceans? *Diversity*, 13, 43. https://doi.org/10.3390/ d13020043

Sabellidae (RT6922). 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 the standard identification resource for the family in Europe, where supplemented by published descriptions (for *Amphicorina*: Giangrande *et al*., 1999; Lopez & Tena, 1999; Yoshihara *et al*., 2012) but many problems remain. ***Amphicorina triangulata*** was first circulated in 2025 **(RT6922)**. About

half of the labs identified **RT6922** correctly (47% error), with most errors for other *Amphcorina* spp.

Giangrande, A., Montanaro, P. & Castelli, A., 1999. On some *Amphicorina* (Polychaeta, Sabellidae) species from the Mediterranean coast, with the description of *A. grahamensis*. *Italian Jornal of Zoology*, 66, 195-203.

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).

Lopez, E. & Tena, J., 1999. A new species of *Amphicorina* (Polychaeta: Sabellidae: Sabellinae) from the Chafarinas Islands (Western Mediterranean). *Cahiers de Biologie Marine*, 40(4), 329-336. https://www.researchgate.net/publication/260460744

Yoshihara, T., Hiruta, S.F., Katoh, T. & Kajihara, H., 2012. Three species of *Amphicorina* (Annelida, Sabellida, Sabellidae) from Japan, with descriptions of two new species. *ZooKeys*, 187, 45-62. doi: 10.3897/zookeys.187.2662

Arthropoda

Oedicerotidae (RT6905). The draft TDP suggests species identifications for oedicerotids, without qualifiers for juveniles, as currently done at APEM, although some specimens thought not to fit perfectly with the described species and a few badly damaged specimens have been left at higher levels, mainly genus. The SD lists 16 species in 7 genera; MSBIAS lists 23 species in 13 genera. ***Westwoodilla caecula*** was first circulated in 2025 (**RT6905**). All labs identified **RT6905** correctly.

Leucothoidae (RT6925). The draft TDP suggests species identifications for Leucothoids, without separation of juveniles, as currently done at APEM. All British species are *Leucothoe*; the SD lists four, MSBIAS lists six. ***Leucothoe incisa*** was circulated in 1995 (RT0609), with 10% error and in 2025 (**RT6905**). Most labs identified **RT6905** correctly (6% error), with one record of *L. lilljeborgi*, best separated using Myers & Costello (1986).

Myers, A.A. & Costello, M.J., 1986. The Amphipod sibling pair *Leucothoe lilljeborgi* Boeck and *L. incisa* Robertson in British and Irish waters. *Journal of the Marine Biological Association of the United Kingdom*, 66(1), 75-82.

Aoridae (RT6906). The draft TDP flags Aoridae for further work, due to different taxonomic levels currently used for different taxa by different labs, particularly for females and juveniles. APEM currently identify males to species and leave females at family level. *Leptocheirus* (Aoridae in Lincoln, 1979, are now considered Corophiidae. A rarely-recorded genus, *Uncinotarsus*, listed in the SD but excluded from Lincoln (1979) is now placed in Unciolidae. Otherwise, the (four) genera listed in the SD are also in MSBIAS, with the addition of the non-native *Grandidierella*. Another non-native (for northern Europe) genus, *Aorides*, is yet to recorded from British waters but three species are known from nearby (Gouillieux et al., 2016). The SD lists six *Microdeutopus*, MSBIAS gives seven; they can be identified using Myers (1969). ***Microdeutopus anomalus*** was first circulated in 2025 (**RT6906**). All labs identified **RT6906** correctly.

Gouillieux, B., Lavesque, N., Leclerc, J.C., Le Garrec, V., Viard, F. & Bachelet, G., 2016. Three non-indigenous species of *Aoroides* (Crustacea: Amphipoda: Aoridae) from the French Atlantic coast. *Journal of the Marine Biological Association of the United Kingdom*, 96(8), 1651-1659.

Lincoln, R.J., 1979. *British marine Amphipoda: Gammaridea*. British Museum (Natural History), London, 658 pp.

Myers, A.A., 1969. A revision of the amphipod genus *Microdeutopus* Costa (Gammaridea: Aoridae). *Bulletin of the British Museum (Natural History) Zoology*, 17(4), 91-148.

Ampithoidae (RT6912). The draft TDP suggest species identification for male Ampithoidae, with further discussion needed for females and juveniles. The SD lists six species in three genera, MSBIAS includes seven species, with two of the previous *Ampithoe* transferred to *Pleonexes* and the addition of a non-native *Ampithoe*. ***Pleonexes gammaroides*** was first circulated in 2025 (**RT6912**). About half of the labs identified **RT6912** correctly (41 % error), with most errors for other Ampithoidae.

Caprellidae (RT6910). The draft TDP suggests species identifications for adult caprellids and for all Caprellidae other than juvenile *Caprella*; these are left at genus if they have the juvenile form (rounded, smooth head). This is the current APEM policy and was derived from the 2012 NMBAQC workshop and guide (Guerra-García, 2014). The SD lists eleven caprellid species, including nine *Caprella* spp.; MSBIAS lists sixteen caprellids, with ten *Caprella*, the recent addition being *C. mutica* Schurin, 1935. ***Caprella acanthifera*** was first circulated in 2025 (**RT6910**). Most labs identified **RT6910** correctly (35% error) but there were several errors, including some for *C. mutica*.

Guerra-García, J.M., 2014. *Caprellidea. Identification guide to British caprellids*. v3.3, NMBAQC 2012 Taxonomic Workshop, Dove Marine Laboratory, 17pp. (unpublished).

Idoteidae (RT6908). The draft TDP originally suggested species identifications for idoteids, without qualifiers for juveniles; this was later (2022) amended to reflect a change in APEM policy, to record juveniles below 5mm at family. The SD lists eleven species in three genera, eight in *Idotea*; MSBIAS lists the same species but with different names for the other genera, one of which has moved to another family (Hognathidae, missing from draft TDP). Naylor & Brandt (2015) allows identification of most Idoteidae, as they are a shallow water family (the book covers intertidal isopods only). ***Idotea pelagica*** was first circulated in 2025 (**RT6908**). All labs identified (large specimens) **RT6908** correctly (0% error). Discussion may still be needed for juveniles.

Naylor, E. & Brandt, A., 2015. *Intertidal marine isopods*. *Keys and notes for the identification of the species*. Synopses of the British Fauna (New Series), No. 3. (Second Edition), Published for The Linnean Society of London by Field Studies Council, Shrewsbury, 144pp

Sphyrapodidae (RT6917). The draft TDP suggests species identifications for Sphyrapodids (as Sphyrapidae), without separation of juveniles, as currently done at APEM. The SD lists only *Sphyrapus malleolus*; MSBIAS lists three other species in two other genera, from deeper water. A fourth species, present in regions west of and adjacent to the British Isles, is *Ansphyrapus tude*s (Norman & Stebbing, 1886), partially illustrated by Guţu (2001), although the whole body drawing is offered in the original description. The NMBAQC scheme's 2025 experts' workshop was partly focussed on Tanaidacea. The presentation (workshop outputs not yet available) included images of *Pseudosphyrapus anomalus*, together with *P. serratus*, which is known from deep, Arctic and Subarctic waters. Specimens from adjacent samples to those used for RT6917 were identified by Magdalena Błażewicz during the workshop. Some keys (Kakui *et al*, 2007; Larsen, 2012; Viskup & Heard, 1989) include both species but do not describe them and there is some ambiguity in the definitions of features of the epimera, as noted by Labs 03, 09, 12. The problem had been discussed in more detail by Hansen (1913) and the relevant text is included here in full: "The most conspicuous and perhaps also the most valuable difference between them is the shape of the

"epimera" of the five anterior abdominal segments; in *S. serratus* these epimera are, seen from above, very outstanding, obliquely triangular, acute but not acuminate, constituting a real saw; in *S. anomalus* they were described by Sars as "not at all produced" and drawn as scarcely or not visible from above, which agrees well with their shape in the males, but often not completely with their shape in the females. In the female from "Ingolf" St. 4 the epimera are visible from above, but much smaller than in *S. serratus*, with the freely outstanding part rather narrow, acuminate and acute, and in several other females the epimera, seen obliquely from above and somewhat from the side, are a little produced, acute, but directed mainly downwards". Hansen (1913) gives three 'Sars' references; Sars (1899) illustrates both sexes for *P. anomalus* (as *Sphyrapus*) but not *P. serratus*. *P. serratus* was partially illustrated by Guţu (1980), which offers a good impression of the distinctive, non-downcurved pleonal epimera. ***Pseudosphyrapus anomalus*** was first circulated in 2025 (**RT6917**). Most labs identified **RT6917** correctly (18 % error). All differences were for *P. serratus*.

Guţu, M. 1980. *Pseudosphyrapus*, a new genus of a new family (Sphyrapidae) of Monokonophora (Crustacea, Tanaidacea). *Travaux du Muséum National d'Histoire Naturelle "Grigore Antipa"*, 22, 393-400.

Guţu, M., 2001. *Ansphyrapus*, a new genus of the family Sphyrapidae (Crustacea: Tanaidacea: Apseudomorpha). *Travaux du Muséum National d'Histoire Naturelle "Grigore Antipa"*, 43, 79-84.

Hansen, H.J., 1913. Crustacea Malacostraca II: Tanaidacea. *The Danish Ingolf Expedition.* Bianco Luno, Copenhagen, 3(3), 1-145; plates 1-12.

Kakui, K., Kajihara, H. & Mawatari, S., 2007. Two new sphyrapodid species (Crustacea: Tanaidacea: Apseudomorpha) from southwestern Japan. *Zootaxa*, 1563, 37-54.

Larsen, K., 2012. Tanaidacea (Crustacea) from Macaronesia II. The deep-water fauna from the Azores archipelago, Portugal. *Zootaxa*, 3250, 26-42. http://www.mapress.com/zootaxa/2012/f/z03250p042f.pdf

Sars, G.O., 1899. *An account of the Crustacea of Norway with short descriptions and figures of all the species. Vol II. Isopoda*. Bergen Museum, Bergen. 261pp.

Viskup, B.J. & Heard, R.W., 1989. Tanaidacea (Crustacea: Peracarida) of the Gulf of Mexico. VIII. *Pseudosphyrapus siegi*, n. sp. (Sphyrapidae) from the continental slope of the northern Gulf of Mexico. *Gulf Research Reports*, 8(2), 107-115.

Akanthophoreidae (RT6913). The draft TDP excluded Akanthophoreidae and some other tanaid families, as several had been included in Leptognathiidae in the previous standard guide (Holdich & Jones, 1983). We suggest species identification for females, where current literature allows; strongly dimorphic swimming males, which could belong to several related families (Błażewicz-Paszkowycz et al., 2014) can be recorded as 'Paratanaoidea male'. The SD excludes Typhlotanaidae from Leptognathiidae and lists fifteen (14) 'leptognathiids' in ten genera, now divided between five families or 'incertae sedis'. Of these, only *Akanthophoreus gracilis* is in Akanthophoreidae but it's listed twice, once as *Leptognathia*, with neither under their 'Akanthophoreinae'. MSBIAS lists five Akanthophoreidae in three genera, mostly from deeper water. Several others may be expected but a full review is not included here, as there is ongoing work on the group. The NMBAQC scheme's 2025 experts' workshop was partly focussed on Tanaidacea, which, together with a tanaid workshop at the University of Łódź (December 2025), identified many more additions and likely future changes. ***'Akanthophoreus gracilis'*** was first circulated in 2025 (**RT6913**). Most labs identified **RT6913** as *A. gracilis*, with two differences (12 % error): one as

Tanaopsis graciloides; the other as *Leptognathiopsis attenuata* Holdich & Bird (1986), which would have keyed to '*Leptognathia manca*' using Holdich & Jones (1983). An identification as *Parakanthophoreus longiremis* (Lilljeborg, 1864) was accepted as correct for the purposes of this exercise, as there has been taxonomic confusion between these species (Bird, 2007; Błażewicz-Paszkowycz & Bamber, 2011), with future changes to be expected (G. Bird, pers comm.). For the near future it may be best to record the taxon as *Akanthophoreus gracilis* 'sensu lato', to cover identifications that fit with Holdich & Jones (1983) and reserve *Akanthophoreus gracilis* only for those specimens with lateral spurs on the pleotelson as illustrated by Sars (1899).

Bird, G.J., 2007. Family incertae cedis (sic). In: Larsen, K. & Shimomura, M. (Eds) 2007. Tanaidacea (Crustacea: Peracarida) from Japan III. The deep trenches; the Kurile-Kamchatka Trench and Japan Trench. *Zootaxa*, 1599, 121-149.

Błażewicz-Paszkowycz, M. & Bamber, R.N, 2011. Tanaidomorph Tanaidacea (Crustacea: Peracarida) from mud-volcano and seep sites on the Norwegian Margin. *Zootaxa*, 3061, 1-35.

Błażewicz-Paszkowycz, M., Jennings, R.M., Jeskulke, K. & Brix, S., 2014. Discovery of swimming males of Paratanaoidea (Tanaidacea). *Polish Polar Research*, 35(2), 415-453.

Holdich, D.M. & Bird, G.J., 1986. Tanaidacea (Crustacea) from sublittoral waters off west Scotland, including the description of two new genera. *Journal of Natural History*, 20, 79-100. https://doi.org/10.1080/00222938600770081

Holdich, D.M. & Jones, J.A., 1983. *Tanaids. Keys and notes for the identification of the species*. Synopses of the British Fauna (New Series), No. 27. Published for The Linnean Society of London and the Estuarine and Brackish-Water Sciences Association by Cambridge University Press, Cambridge, London, New York, New Rochelle, Melbourne, Sydney, 98pp.

Sars, G.O., 1899. *An account of the Crustacea of Norway with short descriptions and figures of all the species. Vol II. Isopoda*. Bergen Museum, Bergen. 261pp.

Palaemonidae (RT6919). The draft TDP suggests species identifications for adult form palaemonids, with qualifiers for larval forms (zoea and megalopa), at Order, as done at APEM. The SD lists eight palaemonids in five genera. MSBIAS lists nine, in four genera, with the transfer of '*Palaemonetes varians*' to *Palaemon* and the addition of the non-native *P. macrodactylus*. ***Palaemon varians*** was circulated in 2005 (RT2509; RT2521), both as '*Palaemonetes varians*', with 8% error and in 2025 (**RT6919**). All labs identified **RT6919** correctly.

Mollusca

Rissoidae (RT6914). The draft TDP suggests species identifications for rissoids without separation of juveniles, as currently done at APEM. 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. The SD lists twenty-nine species and three subspecies in nine genera; MSBIAS lists fifty-five species in seventeen genera, many from deeper water but several in error due to the inclusion of non-British records in the Unicorn database. Only shelf species are included in the revised Linnean Society book (Wigham & Graham, 2017), which also excludes some rarer species in other families. ***Rissoa membranacea***, a species almost restricted to *Zostera*, was circulated in 1995 (RT0605), with 25% error, 2000 (RT1607), with 21% error and in 2025 (**RT6919**). All labs identified **RT6919** correctly.

Wigham, G.D. & Graham, A., 2017. *Marine Gastropods 2: Littorinimorpha and other unassigned Caenogastropoda*. Synopses of the British Fauna (New Series), No. 61. Published for The Linnean Society of London by the Field studies Council, Shrewsbury, 343 pp.

Muricidae (RT6911). The draft TDP suggests species identifications for adult muricids, with further work needed on the separation of juveniles. APEM separate juveniles at 5mm for *Ocenebra* and *Nucella* (both recorded at species). The SD lists ten species in five genera; MSBIAS lists many more, several in error due to the inclusion of non-British records in the Unicorn database. Only shelf species are included in the revised Linnean Society book (Wigham & Graham, 2018). ***Nucella lapillus*** was circulated in 2002 (RT2022), with 7% error, 2014 (RT4609), with 13% error and in 2025 **(RT6911).** Most labs identified **RT6911** correctly (12% error).

Wigham, G.D. & Graham, A., 2018. *Marine Gastropods 3: Neogastropoda*. Synopses of the British Fauna (NS), No 62. Published for The Linnean Society of London by the Field studies Council, 206 pp.

Buccinidae (RT6924). The draft TDP flags Buccinidae for further work, due to different taxonomic levels used for different taxa by different labs, particularly for juveniles. APEM currently identify most to species but leave some of the smaller juveniles at family level. The SD lists fourteen species in eight genera. Several genera found in northern Europe have recently been transferred to families now considered distinct: Chauvetiidae, Colidae. MSBIAS lists many more, many from deeper water but several in error due to the inclusion of non-British records in the Unicorn database. ***Buccinum undatum*** was circulated in 2002 (RT2019, small juveniles), with 67% error, 2014 (RT4609), with 13% error and in 2025 (**RT6924**, also small juveniles)**.** Most labs identified **RT6924** correctly (24% error), with all differences for juvenile *Colus* pp, an improvement since the previous circulation of juveniles; the revised Linnean Society book (Wigham & Graham, 2018) illustrates very few juveniles. Lab 09 stated they leave Buccinidae at family below 10mm; Labs 12, 13, 15 noted they would leave at genus at the size circulated.

Wigham, G.D. & Graham, A., 2018. *Marine Gastropods 3: Neogastropoda*. Synopses of the British Fauna (NS), No 62. Published for The Linnean Society of London by the Field studies Council, 206 pp.

Goniodorididae (RT6909). The draft TDP flags Goniodoridae for further work, due to different taxonomic levels currently used for different taxa by different labs. APEM currently identify some to species but leave some at genus and some the smaller juveniles at family level. The SD lists two species of *Goniodoris*. *G. nodosa* has been transferred to *Okenia*, with *G. castanea* now in *Pelagella*, following Paz-Sedano et al., 2024. *Okenia*, *Ancula* and *Trapania* have been moved into Goniodorididae from other families. MSBIAS lists eleven species in six genera. The standard 'opisthobranch' guide (Thompson, 1988) was followed by a photographic guide to nudibranchs (Picton & Morrow 1994), which was later updated (Picton & Morrow 2023) and now includes some other (but not all) heterobranch groups. ***Okenia nodosa*** (formerly *Goniodoris nodosa*) was first circulated in 2025 (**RT6909**). Most labs identified **RT6909** correctly (6 % error).

Paz-Sedano, S., Moles, J., Smirnoff, D., Gosliner, T.M. & Pola, M., 2024. A combined phylogenetic strategy illuminates the evolution of Goniodorididae nudibranchs (Mollusca, Gastropoda, Heterobranchia). *Molecular Phylogenetics and Evolution*, 192, p.107990.

Picton, B.E. & Morrow, C.C., 1994. *A Field Guide to the Nudibranchs of the British Isles.* Immel Publishing Ltd., London, 143pp.

Picton, B. & Morrow, C., 2023. *Nudibranchs of Britain, Ireland and northwest Europe*. Princeton University Press, Princeton and Oxford, 360pp.

Thompson, T.E., 1988. *Molluscs: Benthic Opisthobranchs*. *(Mollusca: Gastropoda). Keys and notes for the identification of the species*. Synopses of the British Fauna (New Series), No. 8. (Second Edition), Published for The Linnean Society of London and The Estuarine and Brackish-Water Sciences Association by E.J. Brill/Dr W. Backhuys, Leiden, New York, København, Köln, 356pp., plates I-VIII.

Nuculidae (RT6904). The draft TDP suggests species identifications for most nuculids, with separation of juveniles, at family level, at 2mm, as currently done at APEM. Nuculids are often abundant, habitat-characterizing bivalves. The SD lists five species in two genera. MSBIAS lists fourteen species, many from deeper water but several in error due to the inclusion of non-British records in the Unicorn database. The two commonest species have been circulated several times, at different sizes. ***Nucula sulcata*** was first circulated in 2025 (**RT6904**, small specimens). Most labs identified **RT6904** correctly (24% error), with all errors for other *Nucula* spp. Lab 13 noted they would leave at genus at the size circulated.

Thyasiridae (RT6923). The draft TDP suggests species identifications for thyasirids without separation of juveniles, as currently done at APEM. Many laboratories have left juvenile Thyasiridae at genus, sometimes family, and may have done the same with damaged specimens. There have been severe inconsistencies within some projects. APEM identify almost all Thyasiridae to species, without separation of juveniles. Fugro leave *Thyasira* and *Parathyasira* at Family below 2mm. The SD lists eight *Thyasira* species in four subgenera, all of which have since been given full genus rank; MSBIAS lists 26 species in nine genera. Many are covered by Oliver & Killeen (2002) but that guide requires update and is technically restricted to oilfield species. The NMBAQC scheme's 2025 experts workshop was partly focussed on Thyasiridae, with outputs to be updated. ***Axinulus croulinensis*** was circulated in 2010 (RT3915), with 46% error, 2011 (RT4025), with 32% error, and 2025 (**RT6923**). Most labs correctly identified **RT6923** (12% error), showing continued improvement since the inception of the NMBAQC scheme.

Oliver P.G. & Killeen, I.J., 2002. The Thyasiridae (Mollusca: Bivalvia) of the British Continental shelf and North Sea Oil fields. An identification manual. *Studies in Marine Biodiversity and Systematics from the National Museum of Wales. BIOMÔR reports*, 3, 73pp.

Cardiidae (RT6903). The draft TDP flags Cardiidae for further work, mainly due to difficulties with juveniles. Some other laboratories have left all perceived cardiid juveniles (some juvenile *Parvicardium* records have been adult) at family (Fugro record 'Cardiidae juv.' Below 1mm, except *Laevicardium*, which they speciate at all sizes without separation of adults and juveniles); sometimes superfamily (there is only one living family in Cardioidea; use of superfamilies usually results from their being the main key unit in Tebble (1956). APEM speciate *Parvicardium* and *Papillocardium* (without separation of juveniles) and, usually, other cardiid genera with segregation of juveniles. Fugro record *Acanthocardia* and *Cerastoderma* at genus as juveniles between 1mm and 5mm. APEM separate *Acanthocardia* and *Laevicardium* juveniles at 10mm (Genus for *Acanthocardia*) and separate juvenile *Cerastoderma* below 5mm, at species. ***Parvicardium exiguum*** was first circulated in 2025 (**RT6903**). Most labs identified **RT6903** correctly (6% error).

Veneridae (RT6901). The draft TDP flags Veneridae for further work, mainly due to difficulties with juveniles. APEM speciate all larger venerids and separate juveniles at species level for most, at varying sizes (dependant on adult size), genus level for *Dosinia*, *Ruditapes* and *Polititapes*. APEM do not separate juveniles for the smaller-sized species (e.g. *Timoclea*, *Turtonia*). ***Timoclea ovata***

was circulated in 2004 (RT2324), with 47% error, 2006 (RT2719), with 27% error, 2008 (RT3407), with 24% error, 2012 (RT4220), with 0% error and 2025 (**RT6901**, smallish specimens). All labs correctly identified **RT6901** (0% error), showing continued improvement since the inception of the NMBAQC scheme.

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