The National Marine Biological
Analytical Quality Control Scheme
www.nmbaqcs.org

Macrobenthic Exercise Results – MB21

Year 20 (2013/2014)

Authors: **Ruth Barnich & Carsten Wolff**
Reviewed by: Tony Freeston
Approved by: Richard Arnold
Contact: Ruth Barnich
ruth.barnich@unicomarine.com

Thomson Unicomarine Ltd.
Date of Issue: 20 May 2014

EXERCISE DETAILS

Macrobenthos:	21
Type/Contents:	Natural marine sample from the Medway River; 0.5 mm sieve mesh processing.
Circulated:	27/09/2013
Completion Date:	13/12/2013
Number of Participating Laboratories:	8
Number of Results Received:	8

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NMBAQC Scheme Interim Results

LabCode	**LB2026**
SampleCode	**MB21**
Notes	No biomass

Summary Data

Diff. In No. Taxa	**0**
Diff. In No. Individuals	**-2**
Missed Taxa (in residue)	**0**
Missed Individuals (in residue)	**0**
Taxonomic Errors	**0**
Count Variance	**-2**
Biomass %diff.	**-**
Bray-Curtis Similarity index	**99.24**

	Participating Laboratory			**Thomson Unicomarine Ltd.**			
Taxon Number	Taxon Name	Number	Biomass	Taxon Name	Number	Biomass	Comments
1	Carcinus maenas juv	1	-	Carcinus maenas juv.	1	-	
2	Scrobicularia plana juv	1	-	Scrobicularia plana juv.	1	-	
3	Macoma balthica	20	-	Macoma balthica	20	-	
4	Peringia ulvae	50	-	Peringia ulvae	**52**	-	Count error
5	Nematoda	140	-	Nematoda	**143**	-	Count error
6	Cyathura carinata	1	-	Cyathura carinata	1	-	
7	Enchytraeidae	7	-	Enchytraeidae	**6**	-	Count error
8	Tharyx sp A	3	-	Tharyx sp. A	3	-	
9	Eteone longa agg	2	-	Eteone cf. longa	2	-	
10	Manayunkia aestuarina	12	-	Manayunkia aestuarina	12	-	
11	Streblospio	62	-	Streblospio sp.	62	-	
12	Tubificoides benedii	148	-	Tubificoides benedii	147	-	Mixture (see Enchytraeidae below)
13	Nereididae juv	19	-	Nereididae juv.	19	-	
14	Hediste diversicolor	60	-	Hediste diversicolor	**58**	-	Count error
Specimens from within taxon pots							
12				Enchytraeidae	1	-	
Specimens not picked from residue							
		526	0		528	0	

NMBAQC Scheme Interim Results

LabCode	**LB2027**
SampleCode	**MB21**
Notes	Biomass only to 3-decimal scale

Summary Data

Diff. In No. Taxa	**0**
Diff. In No. Individuals	**0**
Missed Taxa (in residue)	**0**
Missed Individuals (in residue)	**0**
Taxonomic Errors	**0**
Count Variance	**0**
Biomass %diff.	**0.73**
Bray-Curtis Similarity index	**100.00**

	Participating Laboratory			**Thomson Unicomarine Ltd.**			
Taxon Number	Taxon Name	Number	Biomass	Taxon Name	Number	Biomass	Comments
1	Mytilus edulis #juv	8	0.001	Mytilidae juv.	8	0.001	TUM id. policy
2	Macoma balthica	1	0.817	Macoma balthica	1	0.811	
3	Electra crustulenta	P	0.001	Electra crustulenta	P	0.001	
4	Stenothoe monoculoides	1	0.001	Stenothoe monoculoides	1	0.001	
Specimens from within taxon pots							
Specimens not picked from residue							
		10	0.820		10	0.814	

NMBAQC Scheme Interim Results

LabCode **LB2029**
SampleCode **MB21**

Notes

Summary Data	
Diff. In No. Taxa	**0**
Diff. In No. Individuals	**-6**
Missed Taxa (in residue)	**0**
Missed Individuals (in residue)	**0**
Taxonomic Errors	**0**
Count Variance	**-6**
Biomass %diff.	**1.04**
Bray-Curtis Similarity index	**97.75**

	Participating Laboratory			**Thomson Unicomarine Ltd.**			
Taxon Number	Taxon Name	Number	Biomass	Taxon Name	Number	Biomass	Comments
1	Nereis diversicolor	91	0.4058	Nereis diversicolor	**92**	0.4080	Count error
2	Streblospio benedicti	19	0.0024	Streblospio sp.	19	0.0025	TUM id. policy
3	Tharyx sp.A	2	0.0013	Tharyx sp. A	2	0.0011	
4	Nematoda	P	-	Nematoda	**6**	0.0005	Count error
5	Macoma balthica	4	0.1811	Macoma balthica	4	0.1700	
6	Mytilus edulis	1	0.0001	Mytilus edulis juv.	1	0.0001	
7	Hydrobia ulvae	58	0.0326	Peringia ulvae	**57**	0.0346	Synonym; Count error
8	(Oligochaeta	29)	0.0089)	-	-	-	lost by PL
Specimens from within taxon pots							
Specimens not picked from residue							
		175	0.6233		181	0.6168	

NMBAQC Scheme Interim Results

LabCode	**LB2033**
SampleCode	**MB21**
Notes	No NMBAQC labels in taxon pots

Summary Data

Diff. In No. Taxa	**-1**
Diff. In No. Individuals	**-22**
Missed Taxa (in residue)	**1**
Missed Individuals (in residue)	**19**
Taxonomic Errors	**0**
Count Variance	**-3**
Biomass %diff.	**2.58**
Bray-Curtis Similarity index	**93.58**

	Participating Laboratory			**Thomson Unicomarine Ltd.**			
Taxon Number	Taxon Name	Number	Biomass	Taxon Name	Number	Biomass	Comments
1	Nephtys hombergii	3	0.1658	Nephtys hombergii	3	0.1514	
2	Hediste diversicolor	81	1.8384	Hediste diversicolor	**85**	1.7980	Count error
3	Macoma balthica	2	0.2707	Macoma balthica	2	0.2701	
4	Hydrobia ulvae	3	0.0041	Peringia ulvae	3	0.0010	Synonym
5	Corophium volutator	1	0.0014	Corophium volutator	1	0.0014	
6	Streblospio shrubsolii	1	0.0003	Streblospio sp.	1	0.0003	TUM id. policy
7	Tharyx sp. A	1	0.0013	Tharyx sp. A	1	0.0012	
8	Tubificoides benedii	6	0.0024	Tubificoides benedii	**5**	0.0020	Count error
9	(Tubuficidae #juv	2)	0.0009)	-	-	-	lost by PL
Specimens from within taxon pots							
Specimens not picked from residue							
				Tubificoides benedii	1	0.0001)	Biomass ignored for stats.
				Peringia ulvae	15	0.0026)	Biomass ignored for stats.
				Bivalvia juv.	1	0.0003)	New taxon; biomass ignored for stats.
				Hediste diversicolor	2	0.0016)	Biomass ignored for stats.
		98	2.2844		120	2.2254	

NMBAQC Scheme Interim Results

LabCode	**LB2034**
SampleCode	**MB21**
Notes	Taxa not in separate vials with NMBAQC labels

Summary Data	
Diff. In No. Taxa	**-1**
Diff. In No. Individuals	**4**
Missed Taxa (in residue)	**1**
Missed Individuals (in residue)	**2**
Taxonomic Errors	**0**
Count Variance	**6**
Biomass %diff.	**-342.98**
Bray-Curtis Similarity index	**94.81**

	Participating Laboratory			**Thomson Unicomarine Ltd.**			
Taxon Number	Taxon Name	Number	Biomass	Taxon Name	Number	Biomass	Comments
1	Mytilus edulis	4	0.0005	Mytilidae juv.	**3**	0.0005	TUM id. policy; Count error
2	Peringia ulvae	35	0.0249	Peringia ulvae	**32**	0.0236	Count error
3	Hediste diversicolor	5	0.0778	Hediste diversicolor	5	0.6705	Biomass transcription error by PL
4	Nephtys hombergii	3	0.0631	Nephtys hombergii	**2**	0.0504	Count error
5	Streblospio benedicti	9	0.0005	Streblospio sp.	9	0.0004	TUM id. policy
6	Heteromastus filiformis	1	0.0002	Heteromastus filiformis	1	0.0002	
7	Tubificoides benedii	1	0.0015	Tubificoides benedii	1	0.0015	
8	Tubificoides pseudogaster	2	0.0001	Tubificoides pseudogaster agg.	**1**	0.0001	Count error
9	Nematoda	19	0.0001	Nematoda	19	0.0001	
Specimens from within taxon pots						-	
Specimens not picked from residue							
				Corophium sp.	1	0.0005)	New taxon; Biomass ignored for stats.
				Nematoda	1	0.0001)	Biomass ignored for stats.
		79	0.1687		75	0.7473	

NMBAQC Scheme Interim Results

LabCode	**LB2035**
SampleCode	**MB21**
Notes	

Summary Data

Diff. In No. Taxa	**-1**
Diff. In No. Individuals	**3**
Missed Taxa (in residue)	**1**
Missed Individuals (in residue)	**3**
Taxonomic Errors	**1**
Count Variance	**6**
Biomass %diff.	**6.72**
Bray-Curtis Similarity index	**98.29**

	Participating Laboratory			**Thomson Unicomarine Ltd.**			
Taxon Number	Taxon Name	Number	Biomass	Taxon Name	Number	Biomass	Comments
1	Hediste diversicolor	30	1.6115	Hediste diversicolor	**31**	1.4849	Count error
2	Tubificoides benedii	135	0.0951	Tubificoides benedii	**133**	0.0949	Count error
3	Tubificoides heterochaetus	1	0.0002	Tubificoides heterochaetus	1	0.0002	
4	Nereididae	23	0.0181	Nereididae juv.	**21**	0.0165	Count error
5	Peringia ulvae	142	0.1046	Peringia ulvae	142	0.1058	
6	Eteone flava agg.	5	0.002	Eteone cf. longa	**4**	0.0020	Count error
7	Streblospio benedicti	30	0.0045	Streblospio sp.	30	0.0045	
8	Aphelochaeta	5	0.0025	**Tharyx sp. A**	**3**	0.0024	Count error; Taxonomic error
9	Macoma balthica juv.	6	0.0188	Macoma balthica juv.	6	0.0210	
10	Abra alba juv.	1	0.0044	Abra alba juv.	1	0.0041	
11	Modiolus juv.	1	0.0003	Mytilidae juv.	1	0.0003	TUM id. policy
12	Manayunkia aestuarina	3	0.0003	Manayunkia aestuarina	3	0.0003	
13	Nephtys assimilis	0	0.0101	Nephthyidae	P	0.0097	
Specimens from within taxon pots							
Specimens not picked from residue							
				Tubificoides benedii	2	0.0001)	Biomass ignored for stats.
				Nematoda	1	0.0001)	New taxon; Biomass ignored for stats.
		382	1.8724		379	1.7466	

NMBAQC Scheme Interim Results

LabCode	**LB2061**
SampleCode	**MB21**
Notes	No biomass

Summary Data	
Diff. In No. Taxa	**0**
Diff. In No. Individuals	**-1**
Missed Taxa (in residue)	**0**
Missed Individuals (in residue)	**1**
Taxonomic Errors	**0**
Count Variance	**0**
Biomass %diff.	**-**
Bray-Curtis Similarity index	**99.84**

	Participating Laboratory			**Thomson Unicomarine Ltd.**			
Taxon Number	Taxon Name	Number	Biomass	Taxon Name	Number	Biomass	Comments
1	Hediste diversicolor	80	-	Hediste diversicolor	80	-	
2	Nereidae #juv	25	-	Nereididae juv.	25	-	
3	Macoma balthica	13	-	Macoma balthica	13	-	
4	Peringia ulvae	84	-	Peringia ulvae	84	-	
5	Tubificoides benedii	92	-	Tubificoides benedii	92	-	
6	Eteone longa agg	1	-	Eteone cf. longa	1	-	
7	Nematoda	4	-	Nematoda	4	-	
8	Tharyx sp A	2	-	Tharyx sp. A	2	-	
9	Cirratulidae sp indet	10	-	Cirratulidae	10	-	bad condition
10	Streblospio shrubsolii	2	-	Streblospio sp.	2	-	TUM id. policy
11	Tubificoides pseudogaster agg	4	-	Tubificoides pseudogaster agg	4	-	
12	Nephtytidae	P	-	Nephthytidae	P	-	
13	Hediste diversicolor	P	-	Hediste diversicolor	P	-	
Specimens from within taxon pots							
Specimens not picked from residue							
				Tubificoides benedii	1	-	
		317	0		318	0	

NMBAQC Scheme Interim Results

LabCode	**LB2062**
SampleCode	**MB21**
Notes	

Summary Data

Diff. In No. Taxa	**0**
Diff. In No. Individuals	**2**
Missed Taxa (in residue)	**0**
Missed Individuals (in residue)	**0**
Taxonomic Errors	**0**
Count Variance	**2**
Biomass %diff.	**2.89**
Bray-Curtis Similarity index	**99.60**

	Participating Laboratory			**Thomson Unicomarine Ltd.**			
Taxon Number	Taxon Name	Number	Biomass	Taxon Name	Number	Biomass	Comments
1	Hediste diversicolor	102	1.1195	Hediste diversicolor	102	1.0921	
2	Tubificoides benedii	20	0.0113	Tubificoides benedii	20	0.0101	
3	Nematoda	16	0.0009	Nematoda	16	0.0008	
4	Macoma balthica	6	0.0245	Macoma balthica	6	0.0231	
5	Hydrobia ulvae	105	0.0649	Peringia ulvae	**103**	0.0597	Synonym; Count error
6	Streblospio shrubsolii	1	0.0003	Streblospio sp.	1	0.0003	TUM id. policy
Specimens from within taxon pots							
						-	
Specimens not picked from residue							
		250	1.2214		248	1.1861	

Table 1. Results from the analysis of Macrobenthic sample MB21 by the participating laboratories.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Number of Taxa				Number of Individuals				Not extracted			Individuals	Similarity	Taxonomic
LabCode	PL	TUM	Diff (n)	%max	PL	TUM	Diff (n)	%max	New Taxa	Ind	%ind	Count Error	index	errors
LB2026	14	14	0	0.0	526	528	-2	0.4	0	0	0.0	-2	99.24	0
LB2027	4	4	0	0.0	10	10	0	0.0	0	0	0.0	0	100.00	0
LB2029	7	7	0	0.0	175	181	-6	3.3	0	0	0.0	-6	97.75	0
LB2033	8	9	-1	11.1	98	120	-22	18.3	1	19	15.8	-3	93.58	0
LB2034	9	10	-1	10.0	79	75	4	5.1	1	2	2.7	6	94.81	0
LB2035	13	14	-1	7.1	382	379	3	0.8	1	3	0.8	6	98.29	1
LB2061	13	13	0	0.0	317	318	-1	0.3	0	1	0.3	0	99.84	0
LB2062	6	6	0	0.0	250	248	2	0.8	0	0	0.0	2	99.60	0

Key: PL - participating laboratory.
TUM - Thomson Unicomarine Ltd.

Table 2. Comparison of the efficiency of extraction of fauna by the participating laboratories for the major taxonomic groups present in sample MB21.

LabCode		Nemertea	Polychaeta	Oligochaeta	Chelicerata	Crustacea	Echinodermata	Mollusca	Other	Overall
LB2026	TUM count	-	156	154	-	2	-	73	143	528
	PL missed	-	0	0	-	0	-	0	0	0
	%missed	-	0.0	0.0	-	0.0	-	0.0	0.0	0.0
LB2027	TUM count	-	-	-	-	1	-	9	-	10
	PL missed	-	-	-	-	0	-	0	-	0
	%missed	-	-	-	-	0.0	-	0.0	-	0.0
LB2029	TUM count	-	113	-	-	-	-	62	6	181
	PL missed	-	0	-	-	-	-	0	0	0
	%missed	-	0.0	-	-	-	-	0.0	0.0	0.0
LB2033	TUM count	-	92	6	-	1	-	21	-	120
	PL missed	-	2	1	-	0	-	16	-	19
	%missed	-	2.2	16.7	-	0.0	-	76.2	-	15.8
LB2034	TUM count	-	17	2	-	1	-	35	20	75
	PL missed	-	0	0	-	1	-	0	1	2
	%missed	-	0.0	0.0	-	100.0	-	0.0	5.0	2.7
LB2035	TUM count	-	92	136	-	-	-	150	1	379
	PL missed	-	0	2	-	-	-	0	1	3
	%missed	-	0.0	1.5	-	-	-	0.0	100.0	0.8
LB2061	TUM count	-	120	5	-	-	-	189	4	318
	PL missed	-	0	1	-	-	-	0	0	1
	%missed	-	0.0	20.0	-	-	-	0.0	0.0	0.3
LB2062	TUM count	-	103	20	-	-	-	109	16	248
	PL missed	-	0	0	-	-	-	0	0	0
	%missed	-	0.0	0.0	-	-	-	0.0	0.0	0.0

Key: TUM count - total number of individuals counted by Thomson Unicomarine Ltd.
PL missed - individuals not picked from residue by participating laboratory
"-" - No data. See forthcoming Annual Report, for details.

Table 3. Comparison of the estimates of biomass made by the participating laboratories with those made by Thomson Unicomarine Ltd. for the major taxonomic groups present in sample MB21. Values are in grams (g).

LabCode		Nemertea	Polychaeta	Oligochaeta	Chelicerata	Crustacea	Echinodermata	Mollusca	Other	Overall	Notes
LB2026	PL	-	-	-	-	-	-	-	-	0	no biomass
	TUM	-		-	-	-	-	-	-	0	
	%diff.	-	-	-	-	-	-	-	-	-	
LB2027	PL	-	-	-	-	0.0010	-	0.8180	0.0010	0.8200	biomass only to 3-decimal scale
	TUM	-	-	-	-	0.0010	-	0.8120	0.0010	0.8140	
	%diff.	-	-	-	-	0.0	-	0.7	0.0	0.7	
LB2029	PL	-	0.4095	-	-	-	-	0.2138	-	0.6233	
	TUM	-	0.4116	-	-	-	-	0.2047	0.0005	0.6168	
	%diff.	-	-0.5	-	-	-	-	4.3	-	1.0	
LB2033	PL	-	2.0058	0.0024	-	0.0014	-	0.2748	-	2.2844	
	TUM	-	1.9509	0.002	-	0.0014	-	0.2711	-	2.2254	
	%diff.	-	2.7	16.7	-	0.0	-	1.3	-	2.6	
LB2034	PL	-	0.1416	0.0016	-	-	-	0.0254	0.0001	0.1687	biomass transcription error by PL
	TUM	-	0.7215	0.0016	-	-	-	0.0241	0.0001	0.7473	
	%diff.	-	-409.5	0.0	-	-	-	5.1	0.0	-343.0	
LB2035	PL	-	1.649	0.0953	-	-	-	0.1281	-	1.8724	
	TUM	-	1.5203	0.0951	-	-	-	0.1312	-	1.7466	
	%diff.	-	7.8	0.2	-	-	-	-2.4	-	6.7	
LB2061	PL	-	-	-	-	-	-	-	-	0	no biomass
	TUM	-	-	-	-	-	-	-	-	0	
	%diff.	-	-	-	-	-	-	-	-	-	
LB2062	PL	-	1.1198	0.0113	-	-	-	0.0894	0.0009	1.2214	
	TUM	-	1.0924	0.0101	-	-	-	0.0828	0.0008	1.1861	
	%diff.	-	2.4	10.6	-	-	-	7.4	11.1	2.9	

Key: PL - participating laboratory
TUM - Thomson Unicomarine Ltd.
"-" - No data. See forthcoming Annual Report, for details.

Table 4. Variation in faunal content of samples distributed as MB21.

Taxa*

LabCode	Nemertea	Polychaeta	Oligochaeta	Chelicerata	Crustacea	Echinodermata	Mollusca	Other	Total taxa
LB2026	-	6	2	-	2	-	3	1	14
LB2027	-	0	0	-	1	-	2	1	4
LB2029	-	3	0	-	0	-	3	1	7
LB2033	-	4	1	-	1	-	3	0	9
LB2034	-	4	2	-	1	-	2	1	10
LB2035	-	7	2	-	0	-	4	1	14
LB2061	-	8	1	-	0	-	3	1	13
LB2062	-	2	1	-	0	-	2	1	6
Mean	-	4	1	-	1	-	3	1	10
Max	-	8	2	-	2	-	4	1	14
Min	-	0	0	-	0	-	2	0	4

Individuals*

LabCode	Nemertea	Polychaeta	Oligochaeta	Chelicerata	Crustacea	Echinodermata	Mollusca	Other	Total Ind.
LB2026	-	156	154	-	2	-	73	143	528
LB2027	-	0	0	-	1	-	9	0	10
LB2029	-	113	0	-	0	-	62	6	181
LB2033	-	92	6	-	1	-	21	0	120
LB2034	-	17	2	-	1	-	35	20	75
LB2035	-	92	136	-	0	-	150	1	379
LB2061	-	120	5	-	0	-	189	4	318
LB2062	-	103	20	-	0	-	109	16	248
Mean	-	87	40	-	1	-	81	24	232
Max	-	156	154	-	2	-	189	143	528
Min	-	0	0	-	0	-	9	0	10

Key: "*" - TUM data used for all faunal groups (includes all faunal groups)
"-" - No data
"0" - Zero values used in calculation of mean/min

Figure 1. MB21 data from participating laboratories based on Bray-Curtis Similarity analysis (raw - untransformed).

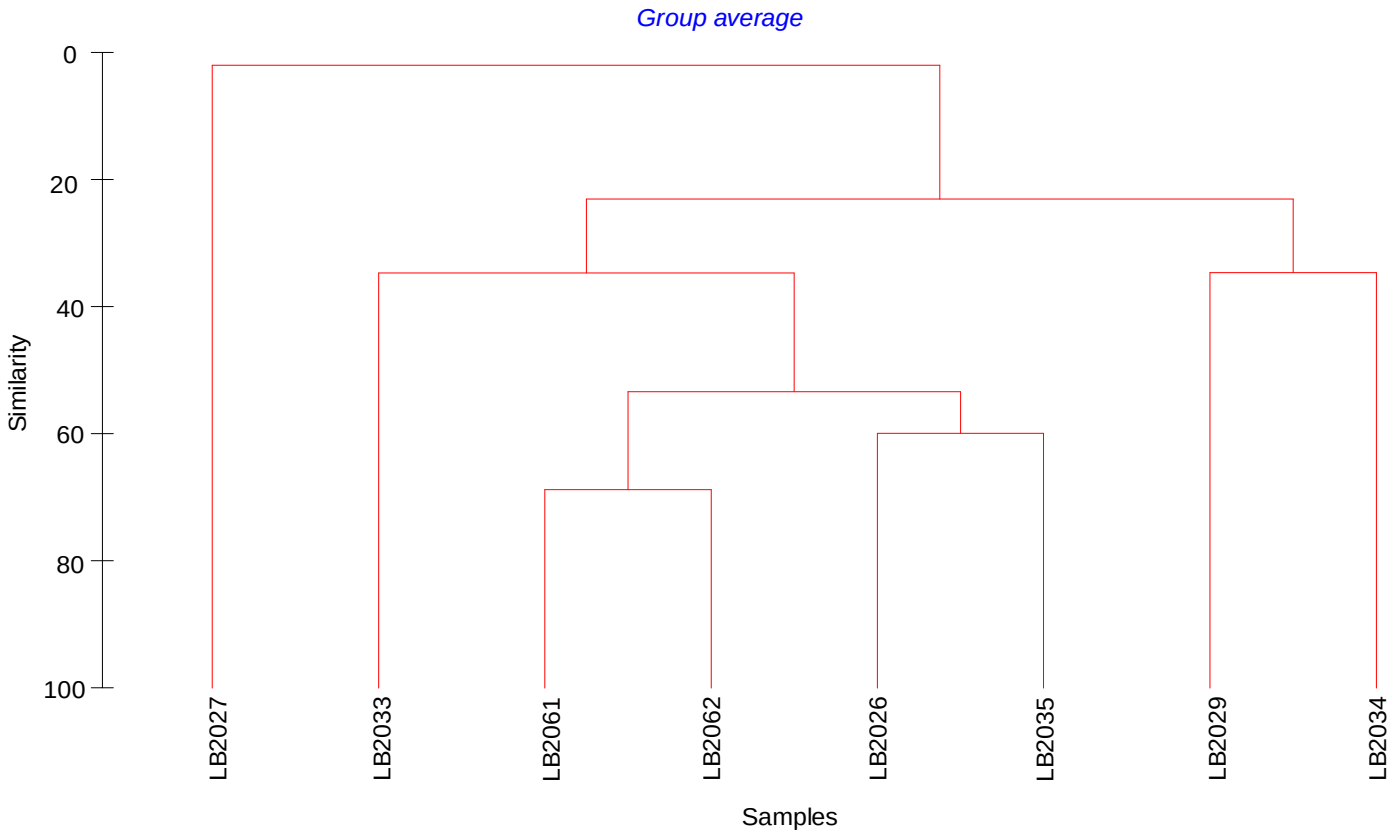
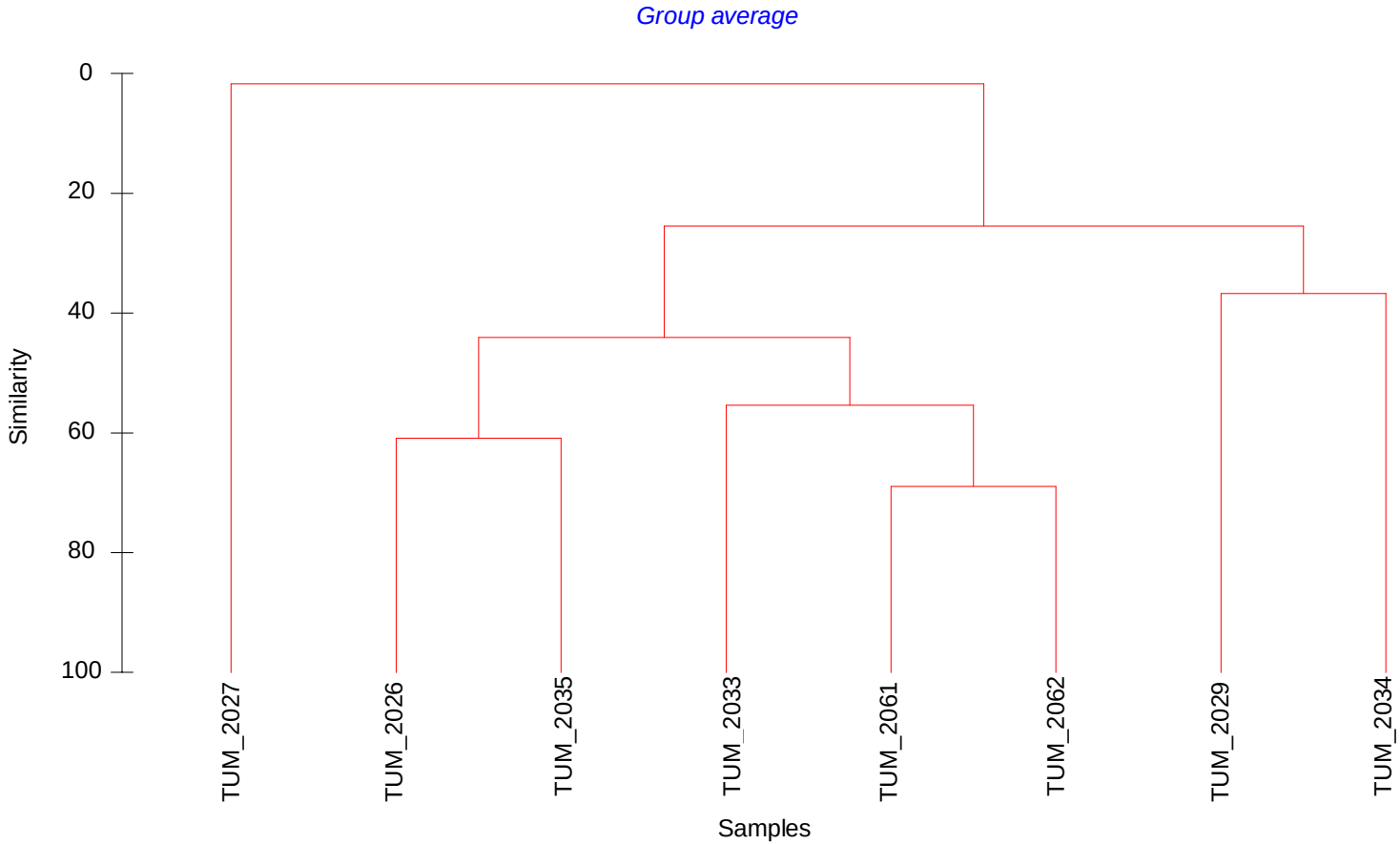


Figure 2. MB21 data re-analysed by Thomson Unicomarine Ltd. based on Bray-Curtis Similarity analysis (untransformed).



Appendix 1

National Marine Biological Analytical Quality Control Scheme

Benthic Invertebrate Component - Macrobenthic sample exercise (MB)

Objective:

- To examine the consistency of extraction and identification of taxa from similar samples

The macrobenthic sample is a training exercise; results are not used to assess the performance of a laboratory.

Protocol:

Each participating laboratory receives a prepared, labelled macrobenthic sample in a sealed pot with minimal alcohol as a temporary preservative. Samples may be either 'natural' ($0.1m^2$ grabs) or artificially created uniform samples. 'Natural' samples are collected on the same day and from the same location at anchor. A single unsorted sample is distributed per Scheme year. Participating laboratories are required to sort and extract all biota, identify to the most accurate taxonomic level practicable, usually species, and enumerate according to the Scheme's processing requirements protocol (PRP) and taxonomic discrimination protocol (TDP). Biomass (blotted wet-weight) values are required for all taxa.

Reporting compares extraction efficiency, identification accuracy, enumeration accuracy and biomass estimates. Participating laboratory *vs.* Thomson Unicomarine Ltd. data set for each sample are compared using the Bray-Curtis similarity index.

Preparation:

Samples should be sieved (0.5 mm) and preserved (if not processed immediately) by the participating laboratory on receipt. Sorted residue and specimens should be returned to Thomson Unicomarine Ltd., where natural samples are re-processed.