



**UKOOA Task 3: Colonisation and
macrofaunal activity in drill cuttings material
– results from small scale laboratory
experiments**

Appendixes

Report RF – 2001/218

RF - Rogaland Research has a certified Quality System in compliance with the
standard NS - EN ISO 9001

Appendix 1

Redox and pH

Beryl 100% Reference

mm	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH
	09.05.2001	09.05.2001	15.05.2001	15.05.2001	01.06.2001	01.06.2001	01.06.2001	18.06.2001	09.07.2001	13.08.2001	13.08.2001	13.08.2001	13.08.2001
0	7.9	7.9	8.2	7.1	7.6	7.8	8	7.6	7.1	7.4	7.5	7.5	7.5
2	7.8	7.9	8.3	7.4	7.6	7.8	8	7.6	7.1	7.4	7.5	7.5	7.5
5	8	8	8.6	7.6	7.7	7.8	8.1	7.6	7.2	7.4	7.5	7.5	7.5
10	8.1	8.2	8.7	7.8	7.9	8.1	8.3	7.8	7.2	7.4	7.5	7.5	7.5
15	8.1	8.2	8.7	7.8	8.0	8.1	8.3	7.9	7.3	7.6	7.8	7.8	7.8
20	8.2	8.2	8.7	8.2	8.1	8.2	8.4	7.9	7.4	7.7	7.9	7.9	7.9
30	8.2	8.2	8.7	8.6	8.2	8.1	8.4	7.9	7.4	7.7	8.1	8.1	8.1

Beryl 100% Arba

mm	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH
	15.05.2001	15.05.2001	01.06.2001	01.06.2001	18.06.2001	09.07.2001	13.08.2001	13.08.2001	13.08.2001	13.08.2001	13.08.2001	13.08.2001	13.08.2001
0	8.2	8.3	7.7	7.7	7.1	7.8	7.8	7.8	7.8	7.5	7.5	7.5	7.5
2	8.3	8.3	7.7	7.7	7.1	7.8	7.8	7.7	7.7	7.6	7.6	7.6	7.6
5	8.3	8.4	7.7	7.7	7.3	7.8	7.9	7.7	7.7	7.7	7.7	7.7	7.7
10	8.5	8.5	8.0	8.0	7.7	7.9	8	7.9	7.9	7.7	7.7	7.7	7.7
15	8.7	8.7	8.0	8.0	7.9	7.8	8.1	8	8	7.9	7.9	7.9	7.9
20	8.8	8.7	8.1	8.2	7.8	7.8	8.3	8.1	8.1	7.9	7.9	7.9	7.9
30	8.8	8.8	8.2	8.2	8	8	8.3	8.2	8	8	8	8	8

Beryl 100% Capitella

mm	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH
	15.05.2001	15.05.2001	01.06.2001	01.06.2001	18.06.2001	09.07.2001	13.08.2001	13.08.2001	13.08.2001	13.08.2001	13.08.2001	13.08.2001	13.08.2001
0	8.3	8.3	7.6	8.2	8	7.9	7.4	7.6	7.6	7.2	7.2	7.2	7.2
2	8.4	8.3	7.6	8.0	8	7.9	7.5	7.6	7.6	7.3	7.3	7.3	7.3
5	8.4	8.4	7.7	8.0	8.1	7.9	7.5	7.6	7.6	7.3	7.3	7.3	7.3
10	8.5	8.4	7.9	8.1	8.2	8	7.6	7.7	7.7	7.4	7.4	7.4	7.4
15	8.6	8.5	8.0	8.2	8.3	8.2	7.8	7.8	7.8	7.7	7.7	7.7	7.7
20	8.8	8.6	8.1	8.3	8.5	8.2	7.9	7.8	7.8	7.8	7.8	7.8	7.8
30	8.8	8.6	8.2	8.2	8.4	8.4	8.1	8	8	7.8	7.8	7.8	7.8

Beryl 20% Reference

mm	09.05.2001	15.05.2001	15.05.2001	15.05.2001	15.05.2001	01.06.2001	01.06.2001	01.06.2001	18.06.2001	09.07.2001	13.08.2001	13.08.2001	13.08.2001	pH
0	7.6	7.43	8.0	8.1	7.1	7.3	7.1	7.1	7.1	7.1	7.3	7.3	7.3	6.9
2	7.6	7.47	7.9	8.1	7.3	7.3	7.1	7.1	7.1	7.2	7.3	7.3	7.3	7
5	7.7	7.47	7.9	8.0	7.3	7.3	7.1	7.1	7.1	7.2	7.4	7.4	7.4	7.1
10	7.8	7.6	8.2	8.1	7.4	7.2	7.2	7.2	7.2	7.2	7.5	7.5	7.5	7.1
15	7.8	7.7	8.4	8.4	7.4	7.4	7.4	7.4	7.3	7.2	7.4	7.4	7.5	7.1
20	7.8	7.7	8.4	8.4	7.4	7.5	7.4	7.4	7.4	7.2	7.3	7.4	7.4	7.1
30	7.7	7.7	8.5	8.5	7.5	7.5	7.5	7.5	7.5	7.4	7.4	7.4	7.4	7.1

Beryl 20% Arba

mm	15.05.2001	15.05.2001	01.06.2001	01.06.2001	01.06.2001	18.06.2001	09.07.2001	13.08.2001	13.08.2001	13.08.2001	13.08.2001	13.08.2001	13.08.2001	pH
0	8.3	7.7	7.3	7.4	7.4	7.9	7.4	7.3	7.3	7.5	7.5	7.5	7.58	
2	8.2	8	7.4	7.4	7.4	7.9	7.4	7.3	7.3	7.5	7.5	7.5	7.6	
5	8.2	8	7.4	7.4	7.4	7.9	7.4	7.3	7.3	7.5	7.5	7.5	7.64	
10	8.4	8.2	7.5	7.5	8	8	7.3	7.4	7.4	7.51	7.51	7.51	7.71	
15	8.4	8.3	7.6	7.5	8.1	8.1	7.3	7.4	7.4	7.53	7.53	7.53	7.59	
20	8.5	8.3	7.6	7.5	8.3	8.3	7.5	7.5	7.5	7.59	7.59	7.59	7.57	
30	8.6	8.5	7.7	7.6	8.3	8.3	7.6	7.5	7.5	7.69	7.69	7.69	7.47	

Beryl 20% Capitella

mm	15.05.2001	15.05.2001	01.06.2001	01.06.2001	01.06.2001	18.06.2001	09.07.2001	13.08.2001	13.08.2001	13.08.2001	13.08.2001	13.08.2001	13.08.2001	pH
0	8.3	8.2	6.9	5.6	7.4	7.4	6.8	5.06	5.06	5.89	5.89	5.89	7.38	
2	8.1	8.1	6.9	6.2	7.5	7.5	7	6.36	6.36	5.86	5.86	5.86	7.38	
5	8.1	8.1	6.9	6.4	7.5	7.5	7	6.32	6.32	5.71	5.71	5.71	7.38	
10	8.2	8.2	7.0	6.6	7.6	7.6	7	6.52	6.52	5.64	5.64	5.64	7.39	
15	8.3	8.2	7.0	6.7	7.7	7.7	7.1	6.6	6.6	5.62	5.62	5.62	7.4	
20	8.3	8.3	7.1	6.6	7.8	7.8	7.1	6.78	6.78	5.7	5.7	5.7	7.41	
30	8.4	8.3	7.2	6.7	7.9	7.9	7.3	6.89	6.89	8	8	8	7.42	

Reference Reference

mm	09.05.2001		15.05.2001		15.05.2001		18.06.2001		09.07.2001		13.08.2001		13.08.2001	
	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH	pH
0	7.4	7.4	8.3	8.3	7.86	7.86	7.41	7.41	7.1	7.1	7.6	7.6	7.3	7.3
2	7.4	7.4	8.1	8.1	7.87	7.87	7.44	7.44	7.1	7.1	7.6	7.6	7.3	7.3
5	7.3	7.3	8.1	8.0	7.87	7.87	7.41	7.41	7.0	7.0	7.6	7.6	7.3	7.3
10	7.3	7.2	8.0	7.9	7.74	7.74	7.24	7.24	7.0	7.0	7.4	7.4	7.2	7.2
15	7.2	7.1	7.9	7.8	7.64	7.64	7.16	7.16	6.9	6.9	7.4	7.4	7.1	7.1
20	7.2	7.1	7.8	7.8	7.57	7.57	7.1	7.1	6.9	6.9	7.3	7.3	7.0	7.0
30	7.1	7.0	7.7	7.7	7.51	7.51	7.09	7.09	6.9	6.9	7.3	7.3	7.0	7.0

Reference Arba

mm	15.05.2001		18.06.2001		09.07.2001		13.08.2001		13.08.2001	
	pH	pH	pH	pH	pH	pH	pH	pH	pH	
0	8.1	8.2	7.59	7.62	5.9	6.7	6.9	6.9	6.9	
2	8.0	8.1	7.59	7.62	6.0	6.8	7.0	7.0	7.0	
5	8.1	8.0	7.56	7.6	6.3	6.8	7.0	7.0	7.0	
10	7.9	8.0	7.52	7.5	6.3	6.6	6.9	6.9	6.9	
15	7.8	7.9	7.44	7.36	6.3	6.6	6.8	6.8	6.8	
20	7.8	7.9	7.36	7.3	6.3	6.6	6.8	6.8	6.8	
30	7.7	7.8	7.33	7.24	6.4	6.6	6.8	6.8	6.8	

Reference Capitella

mm	15.05.2001		18.06.2001		09.07.2001		13.08.2001		13.08.2001	
	pH	pH	pH	pH	pH	pH	pH	pH	pH	
0	8.4	8.2	7.69	7.14	6.3	6.5	7.1	7.1	7.1	
2	8.3	8.1	7.67	7.11	6.6	6.5	7.1	7.1	7.1	
5	8.2	8.1	7.66	7.13	6.6	6.8	7.0	7.0	7.0	
10	8.0	8.0	7.55	7.04	6.4	6.8	6.9	6.9	6.9	
15	8.0	7.9	7.49	6.98	6.4	6.7	6.9	6.9	6.9	
20	8.0	7.9	7.41	6.98	6.4	6.7	6.9	6.9	6.9	
30	7.9	7.9	7.38	7	6.5	6.7	6.9	6.9	6.9	

Appendix 2

APPENDIX 2 VISUAL OBSERVATION RECORDS

Aquarium: Beryl 20% T0

Date: 09/05/01

Responsible: AW

SAMPLE ID	JAR N°	OBSERVATIONS, SEDIMENT		OBSERVATIONS, ANIMALS	
		general comments (colour, surface, etc.)	Dead #	Surface #	general comments (burrowing depth, direction, etc.)
Reference					
Reference					
Reference					
Reference	13	Colour similar to ref sediment (greenish); surface fairly flat; some loose fine material at surface			
Abra	3			6 (1 with valves open, looks sick) 4 (2 half buried)	
Abra	5			4	1 set of siphons of buried animals
Abra	7				
Abra	9			4 (moving their siphons; 2 half buried)	
Capitella	4				Animals on or close to surface but well covered with sediment; limited burrowing, horizontal to 1-2 mm; some tubes projecting above sediment; many mucous trails
Capitella	8				A few animals still on surface but well covered with sediment; burrowing to 6 mm; some tubes projecting above sediment; many mucous trails
Capitella	10				Animals mostly on surface, many clumped together, but covered in sediment particles; no evidence of burrowing; some tubes projecting above sediment; some loose easily suspended sediment on surface
Capitella	11				Animals mostly on surface, many clumped together, but covered in sediment particles; 1 burrow to 6 mm at 45 degrees + 1 long horizontal just below surface ; some tubes projecting above sediment; some mucous trails

Aquarium: Beryl 100%T0

Date: 09/05/01

Responsible: AW

SAMPLE ID	JAR N°	OBSERVATIONS, SEDIMENT		OBSERVATIONS, ANIMALS	
		general comments (colour, surface, etc.)	Dead #	Surface #	general comments (burrowing depth, direction, etc.)
Reference					
Reference					
Reference					
Reference	13	Grey, even colour with depth; looks like clay; some v fine loose material on surface; uneven surface - cohesive			
Abra	3			7 (some look sick, 4 moving siphons)	
Abra	5			7 (most look sick\dead, 1 moving siphons)	
Abra	7			7 (all look sick\dead)	
Abra	9			7 (most look sick\dead, 1 moving siphons)	
Capitella	4				Animals on surface, alive; no burrowing - 1 to 8 mm; long mucous trails
Capitella	8				Most animals on surface, not covered in sediment particles, several around edge of jar; limited burrowing to 4 mm; many mucous trails
Capitella	10				Most animals on surface, many in clumps, not covered in sediment particles, several around edge of jar; no burrowing; v many mucous trails
Capitella	11				Animals on surface, not covered in sediment particles, several around edge of jar; limited burrowing - 1 to 8 mm; mucous trails

Aquarium: Ekofisk 20% T0

Date: 09/05/01

Responsible: AW

SAMPLE ID	JAR N°	OBSERVATIONS, SEDIMENT general comments (colour, surface, etc.)	Dead #	Surface #	OBSERVATIONS, ANIMALS general comments (burrowing depth, direction, etc.)
Reference					
Reference					
Reference					
Reference	13	Greenish; slightly lighter colour at very surface; some fine material on surface; surface uneven - cohesive			
Abra	4			(3 half buried)	1 set of siphons seen of buried animals
Abra	7			3 (2 with moving siphons)	1 set of siphons seen of buried animals
Abra	8			(3 half buried)	2 sets of siphons
Abra	9			2	3 sets of siphons
Capitella	3				Very few left on surface; most burrows long, horizontal at 4 mm depth; a few mucous trails
Capitella	5				Very few left on surface; many burrows projecting above surface; most burrows long, horizontal at 2 mm depth, occasionally vertical to 10 mm; a few mucous trails
Capitella	10				Very few left on surface; many burrows projecting above surface; most burrows long, horizontal at 3-4 mm depth
Capitella	11				Very few left on surface; most burrows long, horizontal at 4 mm depth; a few mucous trails

Aquarium: Ekofisk 100% T0

Date: 09/05/01

Responsible: AW

SAMPLE ID	JAR N°	OBSERVATIONS, SEDIMENT		OBSERVATIONS, ANIMALS	
		general comments (colour, surface, etc.)		Surface #	general comments (burrowing depth, direction, etc.)
Reference					
Reference					
Reference					
Reference	13	Brown; lighter layer on surface approx 1 mm; surface uneven - cohesive - looks like clay; a little v fine material on surface			
Abra	3			4	One set of siphons of buried animal (moving)
Abra	5			3 (+ 2 half buried)	Animals on surface alive (moving siphons)
Abra	7			6 (+ 1 half buried)	No siphons visible but valves closed
Abra	9			1 (+ 2 half buried)	Surface animals moving siphons
Capitella	4	Lighter coloured surface layer of 7 mm;			All animals clumped together on surface, not covered in cuttings material; mucous trails over limited area; no burrows
Capitella	8	Lighter coloured surface layer of 7 mm			All animals clumped together on surface, not covered in cuttings material; mucous trails over limited area; no burrows
Capitella	10	Lighter coloured surface layer of 7 mm			Animals in 3-4 separate clumps on surface, not covered in cuttings material; some long mucous trails; no burrows
Capitella	11	Lighter coloured surface layer of 7 mm			Animals on surface in a clump or lying in straight lines around edge of jar; a few mucous trails; little burrowing

Aquarium: Reference sediment T0

Date: 09/05/01

Responsible: AW

SAMPLE ID	JAR N°	OBSERVATIONS, SEDIMENT		OBSERVATIONS, ANIMALS		
		general comments (colour, surface, etc.)		Dead #	Surface #	general comments (bурrowing depth, direction, etc.)
Reference						
Reference						
Reference						
Reference	13	Greenish, even colour; some loose easily suspended material on surface; uneven surface				
Abra	3				0	1 sets of siphons of buried animals
Abra	5				0	4 sets of siphons of buried animals
Abra	7				0	1 set of siphons of buried animals
Abra	8				1 (half buried)	
Capitella	4					Several left on surface, all well covered with sediment; burrowing to 25 mm, including vertical burrows; some tubes projecting above surface
Capitella	8					Some left on surface, all well covered with sediment; burrowing to 12 mm, vertical burrows; some tubes projecting above surface; few mucous trails
Capitella	10					Several left on surface, all well covered with sediment; burrowing to 25 mm, including vertical burrows; some tubes projecting above surface
Capitella	11					Only a few left on surface, all well covered with sediment; burrowing to 13 mm, including vertical burrows; some tubes projecting above surface; some easily suspended material on surface; v few mucous trails

Aquarium: Beryl 20% T1

Date: 19/06/01

Responsible: ØT, AW

SAMPLE ID	JAR N°	OBSERVATIONS, SEDIMENT		OBSERVATIONS, ANIMALS		
		general comments (colour, surface, etc.)	general comments (burrowing depth, direction, etc.)	Dead #	Surface #	
Reference	1	Olive green surface, not changing markedly with depth.				No signs of animals
Reference	2	Olive green surface, not changing markedly with depth.				No signs of animals
Reference	6	Olive green surface, not changing markedly with depth. Surface partly disturbed by water inflow.				No signs of animals
Reference	12	Olive green surface, not changing markedly with depth.				No signs of animals
Abra	3	Olive green, uniform with depth; little evidence of disturbance at surface - some depressions (burial attempts?).		?7	7	
Abra	5	Olive green, uniform with depth; little evidence of disturbance at surface - some depressions (burial attempts?).		?7	7	
Abra	7	Olive green, uniform with depth; little evidence of disturbance at surface - some depressions (burial attempts?).			6	1 active foot
Abra	9	Olive green, uniform with depth; little evidence of disturbance at surface - some depressions (burial attempts?).		?6	6	
Capitella	4	Olive green, fairly uniform with depth; little evidence of disturbance at surface.				Some tubes at surface, but little flocculent pelletised material; Capitella visible near surface at edge of jar, & burrows down to bottom of jar (one with Capitella in). Most burrows shallow.
Capitella	8	Olive green, fairly uniform with depth; little evidence of disturbance at surface.				Some tubes at surface, but little flocculent pelletised material; Capitella visible near surface at edge of jar, & burrows down to bottom of jar. Most burrows shallow.
Capitella	10	Olive green, fairly uniform with depth; little evidence of disturbance at surface.				Some tubes at surface, but little flocculent pelletised material; Capitella visible near surface at edge of jar, & burrows down to bottom of jar. Most burrows shallow.
Capitella	11	Olive green, fairly uniform with depth; little evidence of disturbance at surface.				Some tubes at surface, but little flocculent pelletised material; Capitella visible near surface at edge of jar, & burrows down to bottom of jar. Most burrows shallow.

Aquarium: Beryl 100%T1

Date: 19/06/01

Responsible: ØT, AW

SAMPLE ID	JAR N°	OBSERVATIONS, SEDIMENT		OBSERVATIONS, ANIMALS		
		general comments (colour, surface, etc.)		Dead #	Surface #	general comments (burrowing depth, direction, etc.)
Reference	1	Pale grey surface, slightly darker below 2 mm. Surface same as at T0.				
Reference	2	Pale grey surface, slightly darker below 2 mm. Surface same as at T0.				
Reference	6	Pale grey surface, slightly darker below 2 mm. Surface same as at T0.				
Reference	12	Pale grey surface, slightly darker below 2 mm. Surface same as at T0.				
Abra	3	Pale grey surface, slightly darker below 2 mm. Some granules at surface (Abra faecal pellets)	3	6		
Abra	5	Pale grey surface, slightly darker below 2 mm	2	7		
Abra	7	Pale grey surface, slightly darker below 2 mm	3	7		
Abra	9	Pale grey surface, slightly darker below 2 mm	3	7		
Capitella	4	Pale grey surface, slightly darker below 2 mm				Not burrowing more than a few mm. Some tubes on the surface
Capitella	8	Pale grey surface, slightly darker below 2 mm				Not burrowing more than a few mm. Some tubes on the surface. Patchy distribution.
Capitella	10	Pale grey surface, slightly darker below 2 mm				Not burrowing more than a few mm. Some tubes on the surface
Capitella	11	Pale grey surface, slightly darker below 2 mm				Not burrowing more than a few mm. Some tubes on the surface

Aquarium: Ekofisk 20% T1

Date: 18/06/01

Responsible: ØT, AW

SAMPLE ID	JAR N°	OBSERVATIONS, SEDIMENT		OBSERVATIONS, ANIMALS		
		general comments (colour, surface, etc.)		Dead #	Surface #	general comments (burrowing depth, direction, etc.)
Reference	1	Grey-green surface; darker greeny below 2-3 mm; some flocculent material on top.				
Reference	2	Grey-green surface; darker greeny below 2-3 mm; some flocculent material on top.				
Reference	6	Grey-green surface; darker greeny below 2-3 mm; some flocculent material on top.				
Reference	12	Grey-green surface; darker greeny below 2-3 mm; some flocculent material on top.				
Abra	4	Grey-green surface 3-4 mm, but partly mixed down to 10 mm. Patchy granular material on surface.	1	1	6 sets of siphons visible at surface.	
Abra	7	Grey-green surface 3-4 mm, but partly mixed down to 10 mm. Patchy granular material on surface.	3 (on surface, open)	4	1 set of siphons visible.	
Abra	8	Grey-green surface 3-4 mm, but partly mixed down to 10 mm. Patchy granular material on surface.	2	2	3 sets of siphons visible. (After sacrificing jar, 5 Abra were seen to be alive and active and 2 were dead, 1 only recently.	
Abra	9	Grey-green surface 3-4 mm, but partly mixed down to 10 mm. Patchy granular material on surface.		2	3 sets of siphons visible	
Capitella	3	Surface 5 mm lighter colour, greeny brown; rest darker greeny brown\grey; surface very pelletised & with discarded tubes - even more so than ref jars above.			Evidence of burrowing seen all over surface and down to about 20 mm; burrows mostly horizontal to 45 degrees.	
Capitella	5	Surface 5 mm lighter colour, greeny brown; rest darker greeny brown\grey; surface very pelletised & with discarded tubes - even more so than ref jars above.			Evidence of burrowing seen all over surface and down to about 20 mm; burrows mostly horizontal to 45 degrees.	
Capitella	10	Surface 5 mm lighter colour, greeny brown; rest darker greeny brown\grey; surface very pelletised & with discarded tubes - even more so than ref jars above.			Evidence of burrowing seen all over surface and down to about 20 mm; burrows mostly horizontal to 45 degrees.	
Capitella	11	As for 10			As for 10	

Aquarium: Ekofisk 100% T1

Date: 18/06/01

Responsible: ØT, AW

SAMPLE ID	JAR N°	OBSERVATIONS, SEDIMENT		OBSERVATIONS, ANIMALS		
		general comments (colour, surface, etc.)		Dead #	Surface #	general comments (burrowing depth, direction, etc.)
Reference	1	Surface 2-3 mm brownish, darker and grey-green below.				Main difference between reference and Capitella\Abra samples is lack of pelletised surface patches - surface is completely uniform.
Reference	2	Surface 2-3 mm brownish, darker and grey-green below.				Main difference between reference and Capitella\Abra samples is lack of pelletised surface patches - surface is completely uniform.
Reference	6	Surface 2-3 mm brownish, darker and grey-green below.				Sample taken. Main difference between reference and Capitella\Abra samples is lack of pelletised surface patches - surface is completely uniform.
Reference	12	Surface 2-3 mm brownish, darker and grey-green below.				Main difference between reference and Capitella\Abra samples is lack of pelletised surface patches - surface is completely uniform.
Abra	3	Surface 2-3 mm brownish, darker and grey-green below, some evidence of disturbance of surface.	3+	7		
Abra	5	Surface 2-3 mm brownish, darker and grey-green below, some evidence of disturbance of surface.	5+	6		
Abra	7	Surface 2-3 mm brownish, darker and grey-green below, some evidence of disturbance of surface.	4	6		Active siphons on 2, both animals partially covered in sediment, sample sacrificed - 3 alive.
Abra	9	Surface 2-3 mm brownish, darker and grey-green below, some evidence of disturbance of surface.		4		6 pairs of active siphons
Capitella	4	Surface 2-3 mm brownish, darker and grey-green below; surface mostly undisturbed.				Some granular material on surface in patches, possibly faecal pellets; some long mucous trails; no animals on surface; burrowing mostly horizontal, to 5 mm depth.
Capitella	8	Surface 2-3 mm brownish, darker and grey-green below; surface mostly undisturbed.				Some granular material on surface, possibly faecal pellets; a few mucous trails; 1 or 2 animals on surface; burrowing mostly horizontal, to 5 mm depth.
Capitella	10	Surface 2-3 mm brownish, darker and grey-green below; surface mostly undisturbed.				Some granular material on surface, possibly faecal pellets; a few mucous trails; no animals on surface; burrowing mostly horizontal, to 5 mm depth.
Capitella	11	Surface 2-3 mm brownish, darker and grey-green below; surface mostly undisturbed.				Some granular material on surface in patches, possibly faecal pellets; some long mucous trails; no animals on surface; burrowing mostly horizontal, to 5 mm depth.

Aquarium: Reference sediment T1

Date: 18/06/01

Responsible: ØT, AW

SAMPLE ID	JAR N°	OBSERVATIONS, SEDIMENT		OBSERVATIONS, ANIMALS		
		general comments (colour, surface, etc.)		Dead #	Surface #	general comments (burrowing depth, direction, etc.)
Reference	1	Greeny surface, not changing markedly with depth; surface slightly uneven; some flocculent material on top.				
Reference	2	Greeny surface, not changing markedly with depth; surface slightly uneven; some flocculent material on top.				
Reference	6	Greeny surface, not changing markedly with depth; surface slightly uneven; some flocculent material on top.				
Reference	12	Greeny surface, not changing markedly with depth; surface slightly uneven; some flocculent material on top.				
Abra	3	Greeny grey/brown, even colour with depth; surface slightly uneven with some possible pellets in patches.	2	1		No siphons seen. Sample sacrificed, one only recently dead.
Abra	5	Greeny grey/brown, even colour with depth; surface slightly uneven with some possible pellets in patches.		0		No siphons seen, but 3 holes probably locations of siphons.
Abra	7	Greeny grey/brown, even colour with depth; surface slightly uneven with some possible pellets in patches.		2		No siphons seen.
Abra	9	Greeny grey/brown, even colour with depth; surface slightly uneven with some possible pellets in patches.	2	2		1 siphon, + 3 holes probably locations of siphons
Capitella	4	Greeny grey/brown, even colour with depth; surface smooth with some granular possible pellets.				Little evidence of Capitella on surface; a few tubes extending above surface; extensive burrowing to bottom of jar, about 40 mm.
Capitella	8	Greeny grey/brown, even colour with depth; surface smooth with some granular possible pellets.				Little evidence of Capitella on surface; a few tubes extending above surface; extensive burrowing to bottom of jar, about 40 mm.
Capitella	10	Greeny grey/brown, even colour with depth; surface smooth with some granular possible pellets.				Little evidence of Capitella on surface; a few tubes extending above surface; extensive burrowing to bottom of jar, about 40 mm.
Capitella	11	Greeny grey/brown, even colour with depth; surface smooth with some granular possible pellets.				Little evidence of Capitella on surface; 6 worms \tubes extending above surface; extensive burrowing to bottom of jar, about 40 mm.

Aquarium: Beryl 20% Intermediate observations

Date: 09/07/01

Responsible:

SAMPLE ID	JAR N°	OBSERVATIONS, SEDIMENT		OBSERVATIONS, ANIMALS		
		general comments (colour, surface, etc.)		Dead #	Surface #	general comments (burrowing depth, direction, etc.)
Reference						
Reference	1	Olive green, no changing markedly with depth				
Reference	6	Olive green, no changing markedly with depth				Surface partly destroyed by water inflow
Reference	12	Olive green, no changing markedly with depth				
Abra						
Abra	3	Olive grey. Slightly darker below surface (2-3 mm)		??	7	
Abra	5	Olive grey. Slightly darker below surface (2-3 mm)		??	7	
Abra	7	Olive grey. Slightly darker below surface (2-3 mm)			6	
Capitella						
Capitella	4	Olive grey surface				Surface partly granulated by Capitella. Most tubes down to 5mm, but some penetrate down to the bottom. Very few Capitella visible.
Capitella	10	Olive grey surface				Surface partly granulated by Capitella. Most tubes down to 5mm, but some penetrate down to the bottom. Very few Capitella visible.
Capitella	11	Olive grey surface				Surface partly granulated by Capitella. Most tubes down to 5mm, but some penetrate down to the bottom. Very few Capitella visible.

Aquarium: Beryl 100% Intermediate observations

Date: 09/07/01

Responsible:

SAMPLE ID	JAR N°	OBSERVATIONS, SEDIMENT general comments (colour, surface, etc.)	Dead #	Surface #	OBSERVATIONS, ANIMALS general comments (burrowing depth, direction, etc.)
Reference					
Reference	2				
Reference	6				
Reference	12	Light grey surface. Grey below. Some darker spots in between.			
Abra					
Abra	3	Light greyish surface (2-3 mm). Slightly darker below. Some darker spots.	?5	6 (1 siphon visible)	
Abra	5	Light greyish surface (2-3 mm). Slightly darker below. Some darker spots.	?7	7	
Abra	9	Light greyish surface (2-3 mm). Slightly darker below. Some darker spots.	?7	7	
Capitella					
Capitella	4	Light grey surface (2-3 mm). Slightly darker grey below, some dark spots (nearly black)			
Capitella	8	Light grey surface (2-3 mm). Slightly darker grey below, some dark spots (nearly black)			Some Capitella visible on surface, clumped together. Capitella tubes only down to a few mm.
Capitella	10	Light grey surface (2-3 mm). Slightly darker grey below, some dark spots (nearly black)			

Aquarium: Ekofisk 20% Intermediate observations

Date: 09/07/01

Responsible:

SAMPLE ID	JAR N°	OBSERVATIONS, SEDIMENT general comments (colour, surface, etc.)		Dead #	Surface #	OBSERVATIONS, ANIMALS general comments (burrowing depth, direction, etc.)
Reference						
Reference	2	Green/brownish surface, 3-4 mm thick. Sediment darker below this layer.				Some flocculated material on top of sediment surface
Reference	6	Green/brownish surface, 3-4 mm thick. Sediment darker below this layer.				Some flocculated material on top of sediment surface
Reference	12	Green/brownish surface, 3-4 mm thick. Sediment darker below this layer.				Some flocculated material on top of sediment surface
Abra						
Abra	4	Brownish-green surface. Darker below 0.5 and 1.5 cm - possible effect of digging Abra			2 (+ 2 visible siphons)	
Abra	7	Brownish-green surface. Darker below 0.5 and 1.5 cm - possible effect of digging Abra			3	
Abra	9	Brownish-green surface. Darker below 0.5 and 1.5 cm - possible effect of digging Abra			2	
Capitella						
Capitella	5	Brownish-green surface. Slightly darker below 0.5 cm				Granulated and flocculated surface. Most tunnels down to 1 cm, + a few down to 3 cm. Few Capitella seen
Capitella	10	Brownish-green surface. Slightly darker below 0.5 cm				
Capitella	11	Brownish-green surface. Slightly darker below 0.5 cm				

Aquarium: Ekofisk 100% Intermediate observations

Date: 09/07/01

Responsible:

SAMPLE ID	JAR N°	OBSERVATIONS, SEDIMENT		OBSERVATIONS, ANIMALS	
		general comments (colour, surface, etc.)		Surface #	general comments (burrowing depth, direction, etc.)
Reference					
Reference	1	Light brown surface, dark grey below			
Reference	2	Light brown surface, dark grey below			
Reference	12	Light brown surface, dark grey below			
Abra					
Abra	3	Light brown surface, dark grey below	?7	7	
Abra	5	Light brown surface, dark grey below	?6	6	
Abra	9	Light brown surface, dark grey below	?2	4 (one with visual siphon, one visual foot)	
Capitella					
Capitella	8	Light brown surface, dark grey below. Surface partly granulated			
Capitella	10	Light brown surface, dark grey below. Surface partly granulated			Capitella tubes down to 5mm. No Capitella seen.
Capitella	11	Light brown surface, dark grey below. Surface partly granulated			

Aquarium: Reference sediment Intermediate

Date: 09/07/01

Responsible:

SAMPLE ID	JAR N°	OBSERVATIONS, SEDIMENT		OBSERVATIONS, ANIMALS		
		general comments (colour, surface, etc.)		Surface #	Dead #	general comments (burrowing depth, direction, etc.)
Reference						
Reference	1	Olive green surface, not changing with depth				
Reference	2	Olive green surface, not changing with depth				
Reference	12	Olive green surface, not changing with depth				Some small flocculated particles on top
Abra						
Abra	5	Olive green surface, not changing with depth		0		2 Abras with siphon, none on surface
Abra	7	Olive green surface, not changing with depth		3		
Abra	9	Olive green surface, not changing with depth		2		1 Abra with visible siphon
Capitella						
Capitella	4	Olive green surface, not changing with depth				
Capitella	10	Olive green surface, not changing with depth				Some flocculated material on top. Tunnels down to bottom, but most down to 20 mm. Few Capitella seen.
Capitella	11	Olive green surface, not changing with depth				

Aquarium: Beryl 20% T2

Date: 13/08/01

Responsible: ØT

SAMPLE ID	JAR N°	OBSERVATIONS, SEDIMENT		OBSERVATIONS, ANIMALS		
		general comments (colour, surface, etc.)		Dead #	Surface #	general comments (burrowing depth, direction, etc.)
Reference						
Reference	1	Olive green sediment; not changing with depth; some flocculent material on top.				
Reference	6	Olive green sediment; not changing with depth; some flocculent material on top.				Surface partly destroyed by water inflow.
Reference	12	Olive green sediment; not changing with depth; some flocculent material on top.				Air pocket in the sediment from the start still present (SEE PHOTO); also seen in other sed jars.
Abra						
Abra	3	Olive green sediment not changing with depth; some flocculent material on top.	??		7	
Abra	5	Olive green sediment not changing with depth; some flocculent material on top.	??		7	
Abra	7	Olive green sediment not changing with depth; some flocculent material on top.			6	
Capitella	4	Olive green sediment not changing with depth; some flocculent material on surface.				Few Capitella seen; burrows down to 20 mm but most 0.5 mm.
Capitella	8					
Capitella	10	Olive green sediment not changing with depth; some flocculent material on surface.				Few Capitella seen; burrows down to 20 mm but most 0.5 mm.
Capitella	11	Olive green sediment not changing with depth; some flocculent material on surface.				Few Capitella seen; burrows down to 20 mm but most 0.5 mm.

Aquarium: Beryl 100%T2

Date: 13/08/01

Responsible: ØT

SAMPLE ID	JAR N°	OBSERVATIONS, SEDIMENT		OBSERVATIONS, ANIMALS		
		general comments (colour, surface, etc.)		Dead #	Surface #	general comments (burrowing depth, direction, etc.)
Reference	1					
Reference	2	Grey-green surface layer 2-3 mm; greyish below with darker (?sulphide) spots below surface; some flocculent material on top; evidence of polychaete burrows & faecal pellets.				
Reference	6	Grey-green surface layer 2-3 mm; greyish below with darker (?sulphide) spots below surface; some flocculent material on top.				
Reference	12	Grey-green surface layer 2-3 mm; greyish below with darker (?sulphide) spots below surface; some flocculent material on top; Possible polychaete tubes & faecal pellets.				
Abra						
Abra	3	Green-grey surface layer 2-3 mm; little flocculent material; light greyish below surface with darker spots.	?6	6		
Abra	5	Green-grey surface layer 2-3 mm; little flocculent material; light greyish below surface with darker spots.	?6	6		
Abra	9	Green-grey surface layer 2-3 mm; little flocculent material; light greyish below surface with darker spots.	?7	7		
Capitella						
Capitella	4	Grey-brown surface layer 2 mm; greyish below surface with darker spots.				
Capitella	8	Grey-brown surface layer 2 mm; greyish below surface with darker spots.				
Capitella	10	Grey-brown surface layer 2 mm; greyish below surface with darker spots (SEE PHOTO).				Burrows to bottom of jar (probably old); most down to 1 cm.

Aquarium: Ekofisk 20% T2

Date: 14/08/01

Responsible: ØT

SAMPLE ID	JAR N°	OBSERVATIONS, SEDIMENT		OBSERVATIONS, ANIMALS		
		general comments (colour, surface, etc.)		Dead #	Surface #	general comments (burrowing depth, direction, etc.)
Reference						
Reference	1	Dark olive green sediment, 2-4 mm surface layer, some flocculent material; darker below, with some dark (?sulphide) spots; .				
Reference	2	Dark olive green sediment, 2-4 mm surface layer, some flocculent material; darker below, with some dark (?sulphide) spots; .				
Reference	12	Dark olive green sediment, 2-4 mm surface layer, some flocculent material; darker below, with some dark (?sulphide) spots; .				
Abra						
Abra	4	Olive green sediment, 1.5-2 cm surface layer; darker below.				Many polychaete burrows seen down to ca 1.5 cm.
Abra	7	Olive green sediment, 1.5-2 cm surface layer; darker below.			6	Many polychaete burrows seen down to ca 1.5 cm.
Abra	9	Olive green sediment, 1.5-2 cm surface layer; darker below.			3	Few polychaete burrows, surface layer thinner than for 7
Capitella						
Capitella	5	Dark olive green sediment, 0-3/4 mm surface layer, some flocculent material; darker below. Most polychaete burrows in top layer but a few down to 2-3 cm and bottom. SIDE PHOTO.				
Capitella	10	Dark olive green sediment, 0-3/4 mm surface layer, some flocculent material; darker below. Most polychaete burrows in top layer but a few down to 2-3 cm and bottom. SIDE PHOTO.				
Capitella	11	Surface 5 mm lighter colour, greeny brown; rest darker greeny brown\grey; surface very pelletised & with discarded tubes - even more so than reference jars above.				Evidence of burrowing seen all over surface and down to about 20 mm; burrows mostly horizontal to 45 degrees.

Aquarium: Ekofisk 100% T2

Date: 13/08/01

Responsible: ØT

SAMPLE ID	JAR N°	OBSERVATIONS, SEDIMENT		OBSERVATIONS, ANIMALS		
		general comments (colour, surface, etc.)		Dead #	Surface #	general comments (burrowing depth, direction, etc.)
Reference						
Reference	1	Surface 2-4 mm light brown, undisturbed, some loose flocculent material; dark grey below.				
Reference	2	Surface 2-4 mm light brown, undisturbed, some loose flocculent material; dark grey below.				
Reference	12	Surface 2-4 mm light brown, undisturbed, some loose flocculent material; dark grey below.				
Abra						
Abra	3	Surface layer very thin, 1-3 mm light brown, some loose flocculent material; dark grey below.		4+	7	
Abra	5	Surface layer very thin, 1-3 mm light brown, some loose flocculent material; dark grey below.		3+	7	No siphons or activity seen
Abra	9	Surface layer very thin, 1-3 mm light brown, some loose flocculent material; dark grey below.		2+	5 + 1 partly buried	1-2 pairs active siphons
Capitella						
Capitella	8	Surface light brown, less distinct and thinner than in Abra & Reference jars, surface granulated; dark grey below.				Some granular material on surface, possibly faecal pellets; no animals on surface; extensive burrowing to ca 1 cm.
Capitella	10	Surface light brown, less distinct and thinner than in Abra & Reference jars, surface granulated; dark grey below.				Some granular material on surface, possibly faecal pellets; no animals on surface; extensive burrowing to ca 1 cm.
Capitella	11	Surface light brown, less distinct and thinner than in Abra & Reference jars, surface granulated; dark grey below, with black (?sulphide) spots.				Some granular material on surface, possibly faecal pellets; no animals on surface; extensive burrowing to ca 1 cm.

Aquarium: Reference sediment T2

Date: 13/08/01

Responsible: ØT

SAMPLE ID	JAR N°	OBSERVATIONS, SEDIMENT		OBSERVATIONS, ANIMALS		
		general comments (colour, surface, etc.)		Dead #	Surface #	general comments (burrowing depth, direction, etc.)
Reference						
Reference	1	Olive green sediment; not changing significantly with depth; flocculent material on top.				
Reference	2	Olive green sediment, not changing significantly with depth; flocculent material on top.				
Reference	12	Olive green sediment; not changing significantly with depth; flocculent material on top.				
Abra						
Abra	5	Olive green sediment, not changing with depth but some darker dots along the jar walls.			0	Surface of sediment uneven compared to Capitella jars.
Abra	7	Olive green sediment, not changing with depth but some darker dots along the jar walls.			4	Surface of sediment uneven compared to Capitella jars.
Abra	9	Olive green sediment, not changing with depth but some darker dots along the jar walls.			3	Surface of sediment uneven compared to Capitella jars.
Capitella						
Capitella	4	Olive green sediment, not changing significantly with depth; flocculent material on top.				Burrows to bottom of jar but most in top 0-2 cm.
Capitella	10	Olive green sediment; not changing significantly with depth; flocculent material on top.				Burrows to bottom of jar but most in top 0-2 cm.
Capitella	11	Olive green sediment, not changing significantly with depth; flocculent material on top.				Burrows to bottom of jar but most in top 0-2 cm.

Appendix 3

APPENDIX 3

Appendix 3. Size and distribution of *Capitella* and *Abra*

Report: UKOOA Task 3: Colonisation and macrofaunal activity in drill cuttings material
 – results from small scale laboratory experiments

Capitella size frequency distribution at T0

Aquarium 1

Size mm	Frequency
0-4	3
5-8	21
9-12	38
13-16	9
17-20	
TOTAL	71

Aquarium 2

Size mm	Frequency
0-4	3
5-8	18
9-12	39
13-16	18
17-20	5
TOTAL	83

Size frequency distribution for total animals measured (aquarium 1 + 2)

Size mm	Frequency
0-4	6
5-8	39
9-12	77
13-16	27
17-20	5
TOTAL	154

Capitella size frequency distribution at T1

Reference

Size mm	Frequency
0-4	0
5-8	13
9-12	11
13-16	2
17-20	1
TOTAL	27

Ekofisk 100%

Ekofisk 20%

Size mm	Frequency	Size mm	Frequency
0-4	4	0-4	3
5-8	32	5-8	13
9-12	10	9-12	10
13-16	1	13-16	0
17-20	1	17-20	0
TOTAL	48	TOTAL	26

Beryl 100%

Size mm	Frequency
0-4	4
5-8	20
9-12	14
13-16	1
17-20	0
TOTAL	39

Beryl 20%

Size mm	Frequency
0-4	8
5-8	19
9-12	5
13-16	2
17-20	0
TOTAL	34

Capitella size frequency distribution at T2
Ekofisk 100%

Size mm	Frequency Jar 10	Frequency Jar 11	Frequency Jar 8
0-4	3	0	4
5-8	12	10	22
9-12	20	6	9
13-16	0	0	0
17-20	0	0	0
TOTAL	35	16	35

Size mm	Frequency
0-4	7
5-8	44
9-12	35
13-16	0
17-20	0
TOTAL	86

Ekofisk 20%

Size mm	Frequency Jar 5	Frequency Jar 11	Frequency Jar 10
0-4	10	2	5
5-8	8	5	4
9-12	2	5	1
13-16	0	0	0
17-20	0	0	1
TOTAL	20	12	11

Size mm	Frequency
0-4	17
5-8	17
9-12	8
13-16	0
17-20	1
TOTAL	43

Reference

Size mm	Frequency Jar 4	Frequency Jar 11	Frequency Jar 10
0-4	1	5	5
5-8	1	4	4
9-12	0	0	1
13-16	0	0	0
17-20	0	0	1
TOTAL	2	9	11

Size mm	Frequency
0-4	11
5-8	9
9-12	1
13-16	0
17-20	1
TOTAL	22

Beryl 100%

Size mm	Frequency	Frequency	Frequency
0-4	1	1	1
5-8	4	2	1
9-12	0	0	2
13-16	0	0	0
17-20	0	0	0
TOTAL	5	3	4

Size mm	Frequency
0-4	3
5-8	7
9-12	2
13-16	0
17-20	0
TOTAL	12

Beryl 20%

Size mm	Frequency Jar 4	Frequency Jar 10	Frequency Jar 11
0-4	1	0	1
5-8	0	0	0
9-12	0	0	0
13-16	0	0	0
17-20	0	0	0
TOTAL	1	0	1

Size mm	Frequency
0-4	2
5-8	0
9-12	0
13-16	0
17-20	0
TOTAL	2

ABRA

Size mm	Frequency
T0	T0
11-12	3
13-14	4
15-16	20
17-18	38
19-20	61
21-22	13
23-24	1
TOTAL	140

Size mm	Frequency
T2	Ref sed
11-12	0
13-14	1
15-16	0
17-18	4
19-20	6
21-22	2
23-24	0
TOTAL	13

Size mm	Frequency
T2	20% Ekofisk
11-12	0
13-14	0
15-16	0
17-18	7
19-20	3
21-22	1
23-24	0
TOTAL	11

Distribution of Capitella

Depth in Jar	Number of <i>Capitella</i> T1				Reference Sediment
	20% Beryl	100% Beryl	20% Ekofisk	100% Ekofisk	
Bottom 25 mm	1	5	3	0	16
Middle 20 mm	19	2	25	4	8
Top 5 mm	19	31	20	23	2
Total	37	38	48	27	26

Number of Capitella T2

Depth in Jar	20% Beryl	20% Beryl	20% Beryl	100% Beryl	100% Beryl	100% Beryl
Bottom 25 mm	0	0	0	0	0	0
Middle 20 mm	0	0	0	2	0	1
Top 5 mm	1	0	0	3	3	3
Total	1	0	0	5	3	4
	20% Ekofisk	20% Ekofisk	20% Ekofisk	100% Ekofisk	100% Ekofisk	100% Ekofisk
5	3	1	0	0	0	
3	0	2	0	3	3	
12	6	8	16	32	32	
20	9	11	35	16	35	
Reference Sediment	Reference Sediment	Reference Sediment				
1	2	0				
1	3	2				
0	4	0				
2	9	2				

	20% Beryl	100% Beryl	20% Ekofisk	100% Ekofisk	Reference Sediment
Bottom 25 mm	0	0	3	0	1
Middle 20 mm	0	1	1.67	2	2
Top 5 mm	0.33	3	8.67	26.67	1.33
Total	0.33	4	13.34	28.67	4.33

Appendix 4.

1 Photos of Abras in five treatments, time series

NOTE: Unfortunately no overview photos were taken the 9th of May, all photos in August were lost due to disk crash in the camera.

Beryl 100 % 9 May Abra jar 7



Beryl 100 % 23 May



Beryl 100 % 1 June



Beryl 100% 19 June



Beryl 100% 9 July



Beryl 20 % 9 May Abra jar-9



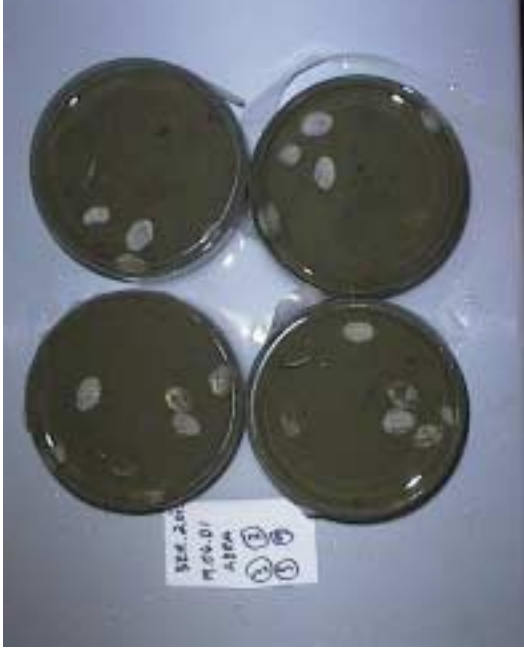
Beryl 20 % 23 May



Beryl 20 % 1 June



Beryl 20% 19 June



Beryl 20% 9 July (jar 11 is wrong marked on label should be jar 5)



Ekofisk 100% 9 May Jar 5



Ekofisk 100% 23 May



Ekofisk 100 % 1 June



Ekofisk 100% 18 June



Ekofisk 100% 9 July

Ekofisk 20% 9 May Jar 8



Ekofisk 20% 23 May

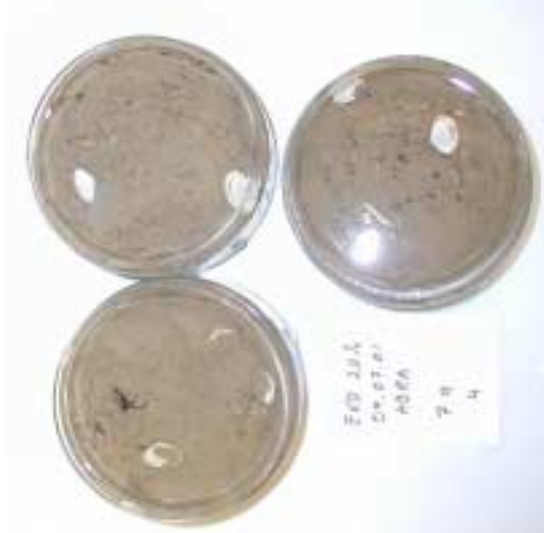


Ekofisk 20 % 1 June

MISSING!!



Ekofisk 20% 18 June



Ekofisk 20% 9 July

Reference 9 May Jar 9



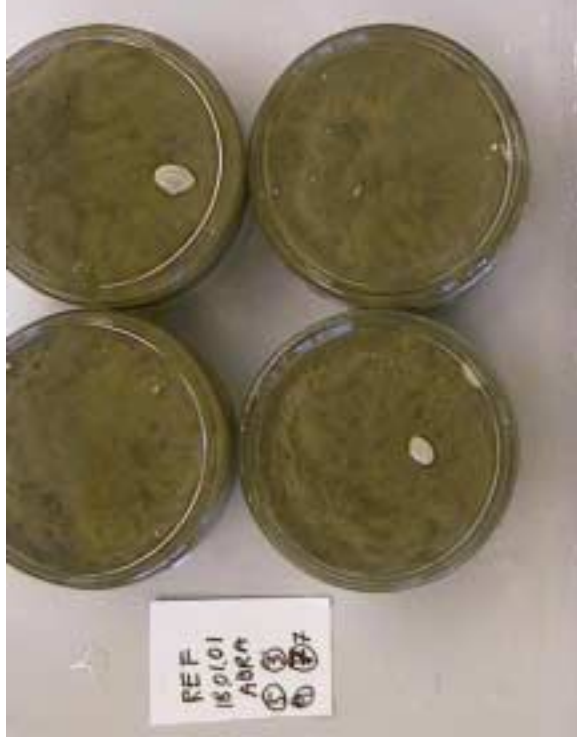
Reference 23 May



Reference 1 June



Reference 18 June



Reference 9 July



Appendix 5. Photos of Capitella, selection

Beryl 100% 15 May *Capitella* jar



Ekofisk 20% 23 May *Capitella* jar 3



Reference 23 May *Capitella* jar 4



Beryl 100% 9 May *Capitella* jar 2



Beryl 20% 9 May *Capitella* jar 2

