

Cruise Report
Cruise 255 RV 'Walther Herwig III'
25.08. - 09.09.2003

Chief Scientist: Dr. Thomas Lang

Abstract

As part of the regular activities of the Institute for Fishery Ecology of the Federal Research Centre for Fishery on biological effects of contaminants in marine fish species, studies were conducted in 8 North Sea and 4 Baltic Sea area.

In addition to the examination of North Sea dab (*Limanda limanda*) and Baltic Sea cod (*Gadus morhua*) and Baltic flounder (*Platichthys flesus*) for macroscopically visible external and internal diseases and parasites, numerous samples were taken for studies on pathological alterations in liver and spleen, contaminant-induced changes in enzyme activities (EROD), inorganic and organic contaminants and their metabolites, age composition, condition factors, and organosomatic indices. In addition, hydrographical measurements were carried out (water temperature, salinity, oxygen content). Fish samples were frozen for the detection of radioactive substances and for measurements of contaminants in the framework of the OSPAR-JAMP/CEMP and HELCOM-BMP monitoring programmes.

The results of the examination of dab for macroscopic lesions largely confirmed last year's findings. Dab from the platform areas P01 (Danfield) and P02 (Ekofisk) were characterised by elevated prevalences of lymphocystis, skin ulcerations (only area P01), the parasite *Stephanostomum baccatum* and a green discolouration of the livers due to a parasitic infection of the bile ducts (only area P02). The decrease in the prevalence of liver tumours in North Sea dab has continued.

The prevalences of acute skin ulcerations in Baltic Sea cod varied between 1,8 % and 10,4 % and were in the range of previous years.

More comprehensive results will be available after subsequent analyses of samples.

1. Objectives of the Cruise

1. Studies on biological effects of contaminants in fish
2. Studies on the occurrence of fish diseases and parasites
3. Sampling of fish for chemical analysis of radioactive substances, heavy metals and organic contaminants
4. Hydrographical measurements (salinity, temperature, oxygen)
5. Sampling of livers and other organs of fish for subsequent histological and biochemical studies
6. Sampling in the inner German Bight to detect changes related to the Elbe flood 2002.

2. Dates of the Cruise

RV 'Walther Herwig III' left Bremerhaven on 25.08., and studies were started in the morning of 26.08. in area P01 in the German Bight. Work in 7 other North Sea areas followed. On 29.08., Renate Künast, the Federal Minister for Consumer Protection, Food and Agriculture, visited the research vessel while out at sea close to Helgoland. On the 30.08., RV 'Walther Herwig III' sailed into the Baltic Sea, passing through the Kiel Channel. The work was continued on 31.08 in area B01 in Kiel Bight. After having finished the work in the Baltic Sea on 03.09., the RV returned to the

North Sea where the programme was completed. According to plan, the cruise ended in the morning of 06.09. in Bremerhaven.

The location of the sampling areas and the cruise dates are shown in Figure 1 and Table 1a and 1b.

In 12 sampling areas (Fig. 1), a total of 51 fishing hauls was performed (towing time 1 h) (see Table 1a). In the North Sea, the GOV was used, in the Baltic Sea a 140 ft bottom trawl with rock hoppers. Hydrographical measurements were made at 28 stations (see Table 1b).

3. Preliminary Results

3.1 Dab (*Limanda limanda*)

In total, 5269 dab were examined for the occurrence of externally visible diseases and parasites and 766 dab for the occurrence of liver anomalies. Results are given in Table 4 and 5. In accordance to previous cruise, generally high prevalences of skin hyperpigmentation (increased aggregation of green to black pigment spots) were noted in areas N06, N04 and particularly N11. The prevalence in areas in the German Bight has increased compared to previous years. Dab from areas P01 and P02 showed elevated prevalences of lymphocystis, skin ulcerations (only in P01), *Stephanostomum baccatum* (parasite in the skin) and green discolouration of the livers (only in area P02).

Liver tumours in dab ≥ 25 cm total length were most prevalent off the Danish coast (area N11), at the Dogger Bank (area N04) and off the English coast (area N22). However, prevalences were generally low and did no longer show distinct spatial patterns. Dab in area N06 off the Scottish coast again showed a pronounced liver parasitism with nematodes and acanthocephalans. Nematodes in the body cavity were also prevalent at area P02.

A variety of samples were taken for subsequent chemical analysis of contaminants as well as for biological effects measurements. More comprehensive results will be available after all samples obtained have been processed.

3.2 Cod (*Gadus morhua*)

1479 cod from the Baltic Sea were examined for the occurrence of externally visible diseases and parasites; (see Table 6). The prevalences of acute/healing skin ulcerations were generally lower compared to previous years. The prevalence in area B11 was 10,4 %, while it was 12,9 % in summer 2002.

3.3 Flounder (*Platichthys flesus*)

201 Baltic flounder from areas BMP and B11 were examined for externally visible diseases (Tab. 7). Lymphocystis occurred at prevalences of 16,7 % and 20,6 %, respectively. Metacercariae of *Cryptocotyle concavum* were prevalent.

3.4 Miscellaneous

The mean catch data of the most frequent fish species are provided in Table 3; Table 4 gives results of the hydrographic measurements.

4. Participants

Dr. Thomas Lang (Chief Scientific)	IFÖ AST Cuxhaven
Ursula Kürschner	IFÖ AST Cuxhaven
Thomas Tepperies	IFÖ AST Cuxhaven
Dr. Michael Haarich	IFÖ Hamburg
Gunther Nagel	IFÖ Hamburg
Alexander Schulz	IFÖ Hamburg
Susanne Ciesielski-Schmeichel	IFÖ Hamburg
Dipl. Math. Werner Wosniok	Univ. Bremen
Dipl. Geogr. Kerstin Jerosch	AWI Bremerhaven
Paul Kotterba	Univ. Greifswald
Nico Geveke	Univ. Oldenburg

3. Acknowledgement

Thanks are due to Captain Hartmann and his crew and to the scientific staff for constructive work and a good atmosphere on board.

4. Annex

7 Tables
1 Figure

Dr. Thomas Lang
(Scientist in charge)

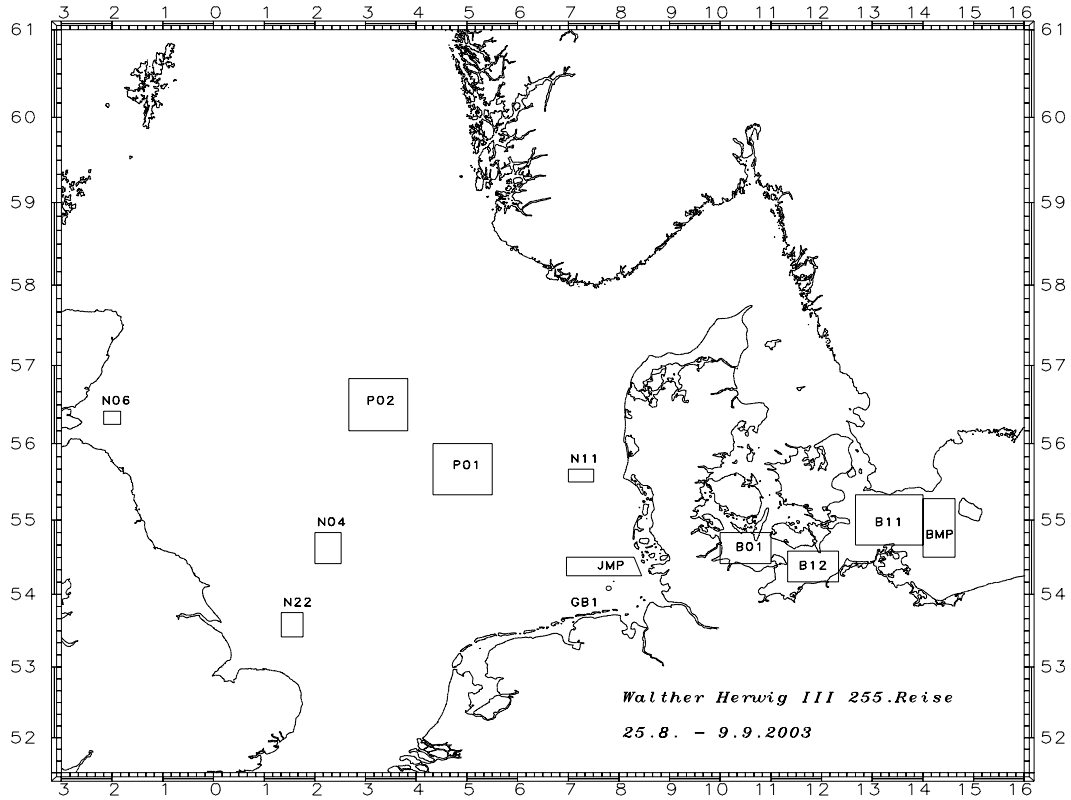


Figure 1: Cruise 255 RV 'Walther Herwig III', 25.08. – 09.09.2003:
Location of sampling areas

Table 1a: Cruise 255 RV 'Walther Herwig III', 25.08. – 09.09.2003:
Location of fishery stations

DATE	STATION	AREA	ICES-RECTANGLE	LATITUDE	LONGITUDE
26.08.03	001	P01	39F4	55°22'76N	04°57'25E
26.08.03	002	P01	39F5	55°26'75N	05°07'73E
26.08.03	003	P01	39F5	55°25'10N	05°13'67E
26.08.03	004	P01	40F5	55°31'63N	05°06'01E
26.08.03	005	P01	39F5	55°27'86N	05°03'34E
27.08.03	006	P02	42F2	56°31'17N	02°53'87E
27.08.03	007	P02	42F3	56°41'10N	03°11'78E
27.08.03	008	P02	42F3	56°32'47N	03°17'50E
27.08.03	009	P02	41F3	56°29'58N	03°09'23E
28.08.03	010	N11	40F7	55°39'32N	07°00'67E
28.08.03	011	N11	40F7	55°35'39N	07°01'66E
28.08.03	012	N11	40F7	55°32'32N	07°12'03E
28.08.03	013	N11	40F7	55°34'29N	07°00'93E
29.08.03	014	JMP	37F7	54°15'66N	07°30'25E
29.08.03	015	JMP	37F7	54°20'38N	07°27'73E
30.08.03	016	JMP	37F7	54°23'77N	07°37'82E
30.08.03	017	JMP	37F7	54°20'89N	07°29'05E
30.08.03	018	JMP	37F7	54°15'98N	07°28'13E
30.08.03	019	GB1	37F7	54°06'78N	07°46'05E
30.08.03	020	GB1	37F7	54°07'36N	07°45'45E
31.08.03	021	B01	38G0	54°35'46N	10°24'35E
31.08.03	022	B01	38G0	54°42'00N	10°17'80E
31.08.03	023	B01	38G0	54°40'06N	10°28'25E
31.08.03	024	B01	38G0	54°33'47N	10°27'27E
01.09.03	025	B12	37G1	54°12'97N	11°34'82E
01.09.03	026	B12	37G1	54°12'38N	11°43'74E
01.09.03	027	B12	37G1	54°16'67N	11°50'33E
01.09.03	028	B12	37G1	54°17'50N	11°35'04E
01.09.03	029	B12	37G1	54°12'20N	11°50'57E
02.09.03	030	BMP	38G4	54°36'88N	14°04'37E
02.09.03	031	BMP	38G4	54°35'87N	14°09'21E
02.09.03	032	BMP	38G4	54°34'37N	14°20'27E
02.09.03	033	BMP	38G4	54°39'15N	14°08'67E
03.09.03	034	B11	38G3	54°44'59N	13°09'78E
03.09.03	035	B11	38G3	54°45'61N	13°18'77E
03.09.03	036	B11	38G3	54°49'67N	13°08'81E
03.09.03	037	B11	38G3	54°49'81N	13°17'32E
03.09.03	038	B11	38G3	54°48'02N	13°12'71E
03.09.03	039	B11	38G3	54°43'21N	13°18'13E
06.09.03	040	N06	41E7	56°16'17N	02°07'08W
06.09.03	041	N06	41E8	56°17'58N	01°56'56W
06.09.03	042	N06	41E7	56°18'82N	02°08'39W
06.09.03	043	N06	41E7	56°23'79N	02°00'32W

Table 1a: (continued)

DATE	STATION	AREA	ICES-RECTANGLE	LATITUDE	LONGITUDE
07.09.03	044	N22	36F1	53°38'11N	01°44'58E
07.09.03	045	N22	36F1	53°41'44N	01°40'24E
07.09.03	046	N22	36F1	53°37'11N	01°38'89E
07.09.03	047	N22	36F1	53°41'36N	01°40'25E
07.09.03	048	N22	36F1	53°37'98N	01°45'39E
08.09.03	049	N04	37F2	54°27'23N	02°09'35E
08.09.03	050	N04	38F2	54°30'05N	02°16'34E
08.09.03	051	N04	38F2	54°38'32N	02°16'15E

Table 1b: Cruise 255 RV 'Walther Herwig III', 25.08. – 09.09.2003:
Location of hydrography stations

DATE	STATION	AREA	ICES-RECTANGLE	LATITUDE	LONGITUDE
26.08.03	001	P01	39F5	55°22'32N	05°08'25E
26.08.03	002	P01	39F5	55°28'64N	05°10'90E
26.08.03	003	P01	40F5	55°35'95N	05°03'50E
26.08.03	004	P01	39F4	55°29'92N	04°56'77E
27.08.03	005	P02	42F3	56°30'41N	03°01'76E
27.08.03	006	P02	42F3	56°36'89N	03°12'85E
27.08.03	007	P02	41F3	56°28'91N	03°22'17E
27.08.03	008	P02	41F3	56°24'87N	03°08'29E
28.08.03	009	N11	40F7	55°31'91N	07°08'63E
28.08.03	010	N11	40F7	55°34'92N	07°06'33E
29.08.03	011	JMP	37F7	54°22'71N	07°34'72E
30.08.03	012	JMP	37F7	54°15'80N	07°30'44E
30.08.03	013	GB1	37F7	54°04'25N	07°53'26E
30.08.03	014	GB1	37F7	54°04'87N	07°51'76E
31.08.03	015	B01	38G0	54°40'63N	10°25'82E
31.08.03	016	B01	38G0	54°35'42N	10°20'12E
01.09.03	017	B12	37G1	54°16'96N	11°44'04E
01.09.03	018	B12	37G1	54°19'65N	11°41'82E
02.09.03	019	BMP	38G4	54°38'10N	14°11'90E
02.09.03	019	BMP	38G4	54°34'72N	14°12'01E
03.09.03	020	B11	38G3	54°47'87N	13°11'65E
03.09.03	021	B11	38G3	54°49'50N	13°09'41E
06.09.03	022	N06	41E7	56°16'88N	02°04'97W
06.09.03	023	N06	41E7	56°19'56N	02°03'26W
07.09.03	024	N22	36F1	53°38'46N	01°44'77E
07.09.03	025	N22	36F1	53°39'24N	01°43'23E
08.09.03	026	N04	37F2	54°27'01N	02°18'26E
08.09.03	027	N04	38F2	54°41'44N	02°10'23E

Table 2: Cruise 255 RV 'Walther Herwig III', 25.08. – 09.09.2003:
Mean catches per 1 h trawling of the most frequent fish species (n = number, kg = weight)

AREA	Cod	Whiting	Haddock	Herring	Sprat	Mackerel	Horse Mackerel	Dab	Plaice	Flounder
P01 n	3	353	41	47	-	2	1	161	12	-
kg	3	39	4	2	-	< 0.5	< 0.5	13	2	-
P02 n	6	74	579	4	-	93	-	584	1	-
kg	2	11	229	< 0.5	-	23	-	37	< 0.5	-
N11 n	-	41	-	6656	25999	10	15470	1773	79	13
kg	-	2	-	137	340	3	144	133	15	20
JMP n	-	73	-	2124	1169	256	14567	139	3	2
kg	-	2	-	16	10	66	201	10	< 0.5	1
GB1 n	-	528	-	365	-	42	462	342	16	15
kg	-	15	-	9	-	13	7	20	1	5
B01 n	726	102	2	180	282	1	-	486	2	1
kg	339	8	< 0.5	2	5	< 0.5	-	54	< 0.5	< 0.5
B12 n	35	790	-	277	139	1	2	5	1	1
kg	38	149	-	4	< 0.5	< 0.5	< 0.5	1	< 0.5	< 0.5
BMP n	130	2	-	15	1	-	-	-	5	34
kg	93	1	-	1	< 0.5	-	-	-	1	9
B11 n	17	54	1	465	486	4	6	37	4	11
kg	6	2	< 0.5	5	7	2	< 0.5	6	1	4
N06 n	3	234	417	7	-	3106		1150	10	8
kg	< 0.5	8	18	1	-	1150		91	1	1
N22 n	1	4	-	1	-	220	2580	225	21	-
kg	< 0.5	< 0.5	-	< 0.5	-	42	26	13	4	-
N04 n	-	-	-	2	-	512	235	367	10	-
kg	-	-	-	< 0.5	-	63	2	27	3	-

Table 3a: Cruise 255 RV 'Walther Herwig III', 25.08. – 09.09.2003:
Water depth, temperature (T), salinity (S) and O₂ saturation, North Sea
(n.g.: no measurements)

Date	Station	Area	Depth (m)	T (°C)	S (PSU)	O ₂ -Saturation
26.08.03	001	P01	2,5	18,30	34,90	102,69
			43,0	8,85	34,40	65,22
	002		2,5	18,22	34,77	101,89
			40,0	8,95	34,44	66,93
	003		2,5	18,19	34,80	102,35
			43,0	9,67	34,67	70,59
004	2,5	18,10	34,81	103,03		
	41,0	8,43	34,59	76,87		
27.08.03	005	P02	2,5	16,98	35,05	28,27
			73,0	7,04	35,07	24,51
	006		2,5	n.g.	n.g.	n.g.
			66,0	16,98	35,07	100,51
	007		2,5	16,98	35,00	101,38
			67,0	7,12	35,06	78,52
008	2,5	17,18	35,09	101,70		
	72,0	7,08	35,10	79,35		
28.08.03	009	N11	2,5	17,50	33,64	94,00
			30,0	16,26	33,94	72,75
	010		2,5	17,53	33,69	98,06
			29,0	16,54	33,91	81,00
29.08.03	011	JMP	2,5	18,46	32,27	94,16
			25,5	18,43	32,30	92,57
30.08.03	012		2,5	18,31	32,23	97,68
			39,0	17,90	32,85	68,68
30.08.03	013	GB1	2,5	18,74	31,44	100,21
			40,0	19,25	32,68	81,58
			014	2,5	18,74	31,51
41,0	19,25	32,74		84,81		
06.09.03	023	N06	2,5	13,83	34,66	103,70
			49,0	13,02	34,66	92,01
	024		2,5	14,33	34,64	103,33
			51,5	13,16	34,66	92,32
07.09.03	025	N22	2,5	16,94	34,54	99,46
			22,5	16,93	34,55	100,55
	026		2,5	16,95	34,53	100,38
			23,5	16,93	34,54	99,11
08.09.03	027	N04	2,5	17,48	34,80	100,72
			15,5	17,48	34,79	101,13
			028	2,5	17,38	34,71
22,5	17,31	34,70		98,66		

Table 3b: Cruise 255 RV 'Walther Herwig III', 25.08. – 09.09.2003:
 Water depth, temperature (T), salinity (S) and O₂ saturation, Baltic Sea
 (n.g.: no measurements)

Date	Station	Area	Depth (m)	T (°C)	S (PSU)	O ₂ -Saturation
31.08.03	015	B01	2,5	17,79	17,02	99,20
			20,0	17,25	21,26	84,98
	016		2,5	17,90	16,50	99,07
			13,0	17,90	16,53	100,88
01.09.03	017	B12	2,5	16,62	13,63	99,45
			22,5	12,91	22,00	66,73
	018		2,5	16,60	13,32	99,42
			22,0	15,91	20,55	76,28
02.09.03	019	BMP	2,5	17,26	7,43	99,11
			26,0	9,47	8,00	75,48
	020		2,5	17,15	7,41	99,44
			18,0	16,45	7,55	96,68
03.09.03	021	B11	2,5	16,54	8,07	100,36
			41,5	16,07	16,84	66,65
	022		2,5	16,66	8,02	101,55
			42,5	15,71	17,06	61,69

Table 4: Cruise 255 RV 'Walther Herwig III', 25.08. – 09.09.2003:
Prevalence of externally visible diseases and parasites of dab (*Limanda limanda*) from the North Sea and Baltic Sea

Area	N unt	Ly	Ep Hyp/Pap	Ulc Ak/Hei	Flo Ak/Hei	KieHy	Hyp Pig	Steph	Acanth	Lepe
P01	623	16,4	2,2	7,4	0,3	4,8	6,3	91,3	6,1	2,9
P02	531	19,6	3,4	2,1	0,2	0,2	1,3	98,9	5,6	0,2
N11	538	5,6	4,1	10,8	0,6	0,0	42,6	20,1	3,3	8,7
JMP	562	2,3	4,4	3,7	0,2	0,0	19,0	9,1	3,2	6,6
GB1	416	1,4	1,4	0,7	0,7	0,0	11,5	3,6	2,9	5,5
B01	469	0,6	0,0	1,9	0,0	0,0	0,4	0,0	0,2	0,2
B12	23	0,0	0,0	4,3	0,0	0,0	0,0	0,0	0,0	0,0
B11	220	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
N06	622	11,7	3,1	8,5	0,3	1,4	40,0	63,7	1,6	0,5
N22	722	3,5	2,8	4,3	0,6	0,1	28,1	7,6	3,2	5,7
N04	543	2,6	2,9	3,5	1,1	0,2	34,6	37,2	4,6	19,2

Table 5: Cruise 255 RV 'Walther Herwig III', 25.08. – 09.09.2003:
Prevalence of liver anomalies in dab (*Limanda limanda*) from the North Sea and Baltic Sea

Area	Length (cm)		N unt	Liver Nodules(mm)			Green Livers	Nema- todes	Kratzer
	from	to		> 2	> 5	>= 10			
P01	20	24	54	3,7	0,0	0,0	0,0	7,4	0,0
P01	25	40	22	0,0	0,0	0,0	0,0	9,1	0,0
P02	20	24	48	2,1	0,0	0,0	68,8	27,1	2,1
P02	25	40	38	2,6	0,0	0,0	57,9	39,5	2,6
N11	20	24	50	2,0	0,0	0,0	0,0	2,0	0,0
N11	25	40	49	18,4	6,1	2,0	0,0	2,0	0,0
JMP	20	24	58	3,4	1,7	0,0	1,7	0,0	0,0
JMP	25	40	3	66,7	33,3	33,3	0,0	0,0	0,0
GB1	20	24	50	4,0	4,0	0,0	0,0	0,0	0,0
GB1	25	40	-	-	-	-	-	-	-
B01	20	24	47	0,0	0,0	0,0	2,1	0,0	0,0
B01	25	40	51	2,0	0,0	0,0	0,0	0,0	0,0
N06	20	24	51	0,0	0,0	0,0	3,9	64,7	21,6
N06	25	40	51	2,0	0,0	0,0	7,8	78,4	33,3
N22	20	24	51	3,9	2,0	2,0	0,0	7,8	2,0
N22	25	40	51	9,8	3,9	3,9	0,0	33,3	2,0
N04	20	24	50	2,0	0,0	0,0	2,0	6,0	2,0
N04	25	40	42	11,9	7,1	4,8	0,0	16,7	0,0

Table 6: Cruise 255 RV 'Walther Herwig III', 25.08. – 09.09.2003:
Prevalence of externally visible diseases and parasites in cod (*Gadus morhua*) from the Baltic Sea

Area	N unt	Ulc Ak/Hei	Skel Def	PBT	NetzAb	Locera	Clav	Cryp
B01	706	1,8	0,8	0,0	0,0	1,1	0,0	92,1
B12	177	6,8	3,4	0,0	0,0	4,5	0,0	67,8
BMP	519	7,7	10,4	0,2	0,0	0,4	0,0	10,2
B11	77	10,4	9,1	0,0	0,0	1,3	0,0	11,7

Tab. 7: Cruise 255 RV 'Walther Herwig III', 25.08. – 09.09.2003:
Prevalence of externally visible diseases and parasites in flounder (*Platichthys flesus*) in the Baltic Sea

Area	N unt	Ly	Ulc Ak/Hei	UlcAb	Skel Def	Hyp Pig	Cryp
BMP	138	16,7	0,0	0,0	0,7	0,7	71,7
B11	63	20,6	0,0	0,0	1,6	1,6	68,3

Abbreviations:

N unt	= number of fish examined
Ly	= Lymphocystis
Ep Hyp/Pap	= Epidermal papilloma/hyperplasia
Ulc Ak/Hei	= Skin ulcerationen, acute/healing
Flo Ak/Hei	= Fin rot/erosion, acute/healing
KieHy	= X-cell gill disease
HypPig	= Hyperpigmentation
Skel Def	= Skeletal deformities
PBT	= Pseudobranchial pseudotumour (swelling)
Netz Ab	= Healed net injury
Kratzer	= Acanthocephaleans
<i>Steph</i>	= <i>Stephanostomum baccatum</i>
<i>Acanth</i>	= <i>Acanthochondria cornuta</i>
<i>Lepe</i>	= <i>Lepeophtheirus pectoralis</i>
<i>Locera</i>	= <i>Lernaeocera branchialis</i>
<i>Clav</i>	= <i>Clavella adunca</i>
<i>Cryp</i>	= <i>Cryptocotyle lingua</i>