

Pathology Service

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
# cases submitted to the diagnostic service	35	39	44	49	38	80	95	96	60	51	64	53	48
# submitting facilities	26	25	27	29	23	43	46	68	28	28	33	35	29
# facilities reporting clinical disease	19	23	22	19	10	31	30	47	18	17	22	25	22
total # fish submitted	277	348	496	576	591	1111	1441	1294	1279	762	737	698	511

Percentages of total fish examined and submitting facilities diagnosed with the disease

	fish	facilities	fish	facilities	fish	facilities	fish	facilities	fish	facilities	fish	facilities	fish	facilities	fish	facilities	fish	facilities
<i>Pseudoloma neurophila</i>	10.83	19.23	11.21	52.00	21.17	62.96	29.49	51.72	39.29	46.51	13.12	60.87	11.44	39.88	11.73	39.29	7.74	46.43
<i>Pleistophora hyphessobryconis</i>	0.00	0.00	0.00	0.00	0.00	0.00	1.22	6.90	0.34	4.35	0.27	4.65	1.53	4.35	0.00	0.00	0.13	3.57
<i>Mycobacterium</i> spp.	6.86	46.15	6.32	36.00	9.88	48.15	4.69	34.48	5.25	43.48	5.31	32.56	5.27	43.48	6.18	33.82	3.44	42.86
Bacterial infection (non-acid fast)	4.33	26.92	5.57	8.00	0.40	7.41	0.52	10.34	0.00	0.00	0.36	6.98	0.42	10.87	0.39	2.94	0.08	1.57
<i>Pseudocapillaria tomentosa</i>	0.00	0.00	3.16	20.00	0.60	11.11	0.17	3.45	1.18	13.04	3.60	16.28	1.32	13.04	1.47	8.82	1.33	14.29
Other helminths	0.00	0.00	2.30	12.00	0.00	0.00	0.17	3.45	0.17	4.35	0.09	2.33	0.14	4.35	0.08	1.47	0.00	0.00
<i>Myxidium streisingeri</i>	3.25	11.54	4.45	20.00	2.82	22.22	1.91	20.69	4.06	30.43	4.21	27.91	4.02	34.78	2.32	14.71	2.74	25.00
Fungal infection	0.00	0.00	0.29	4.00	0.20	3.70	0.00	0.00	0.00	0.00	0.09	2.33	0.35	2.17	0.00	0.00	0.00	0.00
hepatic megalocytosis	3.25	11.54	2.59	12.00	7.25	25.93	14.76	24.48	13.71	30.43	6.11	32.61	8.04	17.65	12.04	64.29	12.47	28.57
Egg-associated inflammation/oophoritis	13.72	61.54	10.92	36.00	19.76	55.56	12.15	68.97	6.26	43.48	5.22	39.53	4.44	52.17	10.59	36.76	11.88	67.86
Nephrocalcinosis	1.08	11.54	0.85	4.00	2.62	18.52	2.08	20.69	1.35	26.09	2.52	25.58	2.15	30.43	3.25	19.12	2.42	39.29
Gill lesions	5.78	15.38	0.86	8.00	2.62	11.11	2.78	11.24	3.21	8.70	6.84	32.56	2.91	23.91	3.55	20.59	2.03	35.71
<i>Edwardsiella ictaluri</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.08	6.98	0.00	0.00	0.00	0.00	0.00	0.00
Duct hyperplasia (pancreatic or biliary)	2.17	23.08	1.44	16.00	1.22	20.69	1.69	21.74	1.89	13.95	1.11	19.57	1.08	14.71	1.02	21.43	2.49	35.71
Intestinal neoplasia, dysplasia, or hyperplasia	2.53	11.54	1.44	18.00	1.39	10.34	3.21	8.70	7.31	11.53	1.94	6.52	2.01	11.76	2.27	21.43	1.97	17.86
Seminoma	6.86	23.08	3.72	12.00	2.62	25.93	1.74	20.69	0.85	17.39	1.89	18.60	1.60	28.26	1.39	14.71	1.95	28.57
Ultrabranched adenoma or adenocarcinoma	0.00	0.00	0.29	4.00	1.41	14.81	1.74	13.79	1.02	21.74	0.90	13.95	0.28	8.70	0.77	8.82	0.39	7.14
Chordoma	0.36	3.85	0.00	0.00	0.20	3.70	0.17	3.45	0.34	8.70	0.09	2.33	0.00	0.00	0.00	0.00	0.00	0.00
Other neoplasia	1.81	15.38	1.44	12.00	2.22	25.93	1.04	10.34	1.35	8.70	0.81	13.95	0.56	13.04	1.31	14.71	0.83	17.86
Spinal deformity (in histologic sections)	2.53	15.38	0.29	4.00	1.21	11.11	1.91	20.69	0.34	4.35	0.99	9.30	1.39	26.09	0.93	11.76	2.97	42.86
<i>Piscinoodinium pillulare</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.80	2.33	0.83	2.17	0.54	1.47	0.00	0.00
Aerocystitis - etiology unknown	1.44	11.54	2.30	20.00	1.61	25.93	0.52	6.90	0.00	0.00	1.08	6.98	0.21	6.52	0.70	2.35	1.17	21.43
Ceolomitis - etiology unknown	1.44	15.38	0.57	8.00	0.60	7.41	1.39	11.24	0.68	11.04	1.18	18.90	2.01	20.59	3.67	35.71	0.68	12.12
Intersex	0.00	0.00	0.57	8.00	0.20	3.70	0.17	3.45	0.34	8.70	0.09	2.33	0.21	4.35	0.15	2.94	0.16	3.57

SUMMARY OF ZIRC IN-HOUSE DIAGNOSTIC TESTING

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total # Main Room fish sampled	170	132	698	395	411	389	499	787	1038	1330	1435	1374	1145
# Quarantine Room fish sampled	0	2	1	0	0	11	137	125	398	N/A	382	177	180

Total number of fish diagnosed with the disease in the ZIRC Main Fish Room (M) and Quarantine Room (Q)

	M	Q	M	Q	M	Q	M	Q	M	Q	M	Q	M	Q	M	Q	M	Q
<i>Pseudoloma neurophila</i>	25	-	27	0	182	0	58	-	49	-	0	3	0	15	24	18	130	26
<i>Pleistophora hyphessobryconis</i>	0	-	0	0	0	0	0	-	0	-	0	0	0	0	0	0	0	0
<i>Mycobacterium</i> spp.	46	-	3	0	50	0	0	-	7	-	27	0	15	4	2	1	10	7
Bacterial infection (non-acid fast)	2	-	0	0	0	0	0	-	0	-	0	0	1	0	6	0	0	0
<i>Pseudocapillaria tomentosa</i>	0	-	0	0	0	0	0	-	0	-	0	0	0	0	0	0	0	0
Other helminths	0	-	0	0	0	0	0	-	0	-	0	0	0	0	0	0	0	0
<i>Myxidium streisingeri</i>	0	-	0	1	0	0	0	-	0	-	0	0	0	0	0	0	0	0
Fungal infection	1	-	0	0	0	0	0	-	0	-	1	0	0	0	0	0	0	0
hepatic megalocytosis	12	-	9	0	31	0	28	-	33	-	59	1	62	6	104	9	157	32
Egg-associated inflammation/oophoritis	20	-	123	0	26	0	12	-	8	-	8	0	25	9	58	1	58	1
Nephrocalcinosis	2	-	0	0	9	0	4	-	2	-	4	0	15	1	18	0	16	0
Gill lesions	0	-	0	0	0	0	0	-	0	-	0	8	1	10	3	20	0	14
<i>Edwardsiella ictaluri</i>	0	-	0	0	0	0	0	-	0	-	0	0	0	0	0	0	0	0
Duct hyperplasia (pancreatic or biliary)	0	-	0	0	9	0	0	-	0	-	0	0	3	3	2	3	2	0
Intestinal neoplasia, dysplasia, or hyperplasia	0	-	0	0	0	0	2	-	0	-	3	0	1	2	3	0	17	2
Seminoma	0	-	0	0	0	0	0	-	0	-	0	0	0	0	3	1	3	0
Ultrabranched adenoma or adenocarcinoma	1	-	0	0	4	0	4	-	0	-	0	0	1	0	5	1	1	0
Chordoma	0	-	0	1	2	1	0	-	0	-	1	0	2	0	2	0	2	0
Other neoplasia	2	-	0	0	20	0	11	-	0	-	1	0	3	1	14	2	10	1
Spinal deformity (in histologic sections)	0	-	3	0	2	0	6	-	0	-	17	0	3	0	6	0	12	0
<i>Piscinoodinium pillulare</i>	0	-	0	0	0	0	0	-	0	-	0	0	0	0	0	0	0	0
Aerocystitis - etiology unknown	0	-	2	2	0	0	0	-	0	-	0	0	1	3	5	0	1	0
Ceolomitis - etiology unknown	1	-	0	0	6	0	5	-	1	-	0	0	2	0	4	2	9	-
Intersex	0	-	0	0	0	0	0	-	0	-	0	0	2	0	0	0	0	0

***Mycobacterium* spp.**

A single species of *Mycobacterium*, *M. chelonae*, has been identified from zebrafish and biofilms in the ZIRC Main Fish Room (Whipps et al., 2008).

ZIRC sends all paraffin blocks of fish diagnosed with mycobacteriosis to the Oregon State University Veterinary Diagnostic Laboratory for a PCR assay to identify the species of *Mycobacterium*. *M. chelonae* is the only species that has been identified in ZIRC fish.

