

Sea lice prevention strategies affect cleaner fish delousing efficacy in commercial Atlantic salmon sea cages

K. Gentry*, S. Bui, F. Oppedal, T. Dempster

*Corresponding author: kat.gentry@unimelb.edu.au

Aquaculture Environment Interactions 12: 67–80 (2020)

Fig. S1 The number of cleaner fish in each cage during the experimental period. Estimates were made by counting the number of cleaner fish found in the salmon mortality net at the bottom of cage and subtracting these from the known stocked number.

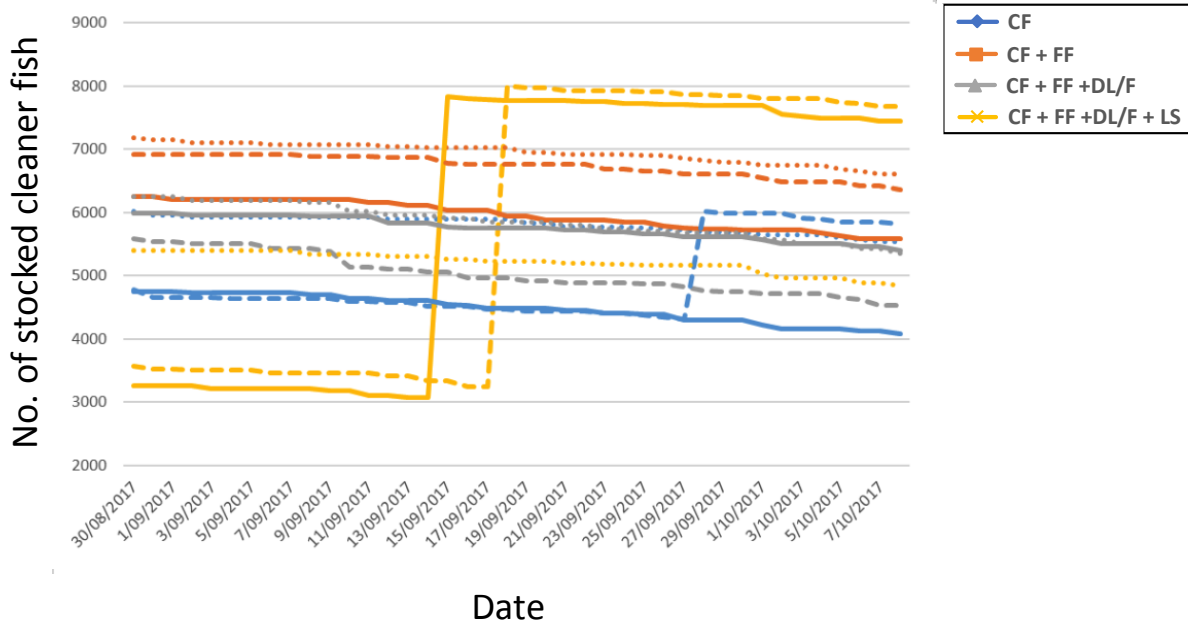


Table S1: weather conditions, cleaner fish numbers, lice numbers, lice treatments, and other events occurring to each cage over the three sample times. CF = cleaner fish, FF = functional feed, DL/F = deep light and deep feeding, LS = lice skirts.

Sample	Weather conditions by date	Anti-lice strategy	Cage number	CF		Lice				Other events		
				No. of CF stocked (excluding attrition)	Weeks since latest delivery of CF	Mean no. of attached lice per salmon		Mean no. of mobile lice per salmon			Date of most recent lice treatment	Type of most recent lice treatment
						3 weeks before	This week	3 weeks before	This week			
1	30/8/17 Sunny, clear day, no wind. 31/8/17 Sunny, clear day, no wind, calm water. 1/9/17 Intermittent rain, no wind.	CF	4	5956	3	0.55	0.20	0.60	0.19	11/5/2017	Thermolicer	1/9/17 Net cleaning.
			5	7946	0	2.05	0.55	0.60	0.52	12/5/2017	Thermolicer	
			12	7791	1	1.05	0.30	0.33	1.00	12/5/2017	Thermolicer	
			μ	7231	1.3	1.22	0.35	0.51	0.57	-	-	
		CF + FF	1	7903	1	2.65	1.55	0.95	1.30	3/3/2017	H ₂ O ₂	
			8	7767	0	1.05	0.25	0.05	0.20	11/5/2017	Thermolicer	
			11	8090	1	1.25	0.75	1.35	2.10	12/5/2017	Thermolicer	
			μ	7920	0.7	1.65	0.85	0.79	1.20	-	-	
		CF + FF + DL/F	2	6347	3	0.90	0.90	0.90	1.76	13/5/2017	Thermolicer	
			6	7453	1	0.45	0.55	0.76	1.05	12/5/2017	Thermolicer	
			9	6728	1	1.3	0.45	0.80	0.50	11/5/2017	Thermolicer	
μ	6843		1.7	1.22	0.63	0.82	1.10	-	-			
CF + FF + DL/F + LS	3	7952	1	0.15	0.40	0.40	2.30	13/5/2017	Thermolicer			
	7	7406	1	0.20	0.35	0.25	0.40	6/5/2017	Thermolicer			
	10	6739	1	0.05	0.10	0.38	1.50	6/5/2017	Thermolicer			
	μ	7366	1.0	0.13	0.28	0.34	1.40	-	-			
2	12/9/17 Cloudy, intermittent rain, some wind. 13/9/17 Overcast, no wind or rain. 14/9/17 Sunny, a few clouds, no wind.	CF	4	7688	1	0.20	0.40	0.19	1.67	11/5/2017	Thermolicer	13/9/17 Catching salmon for lice counts. 14/9/17 Catching salmon for lice counts.
			5	9446	0	0.55	1.85	0.52	1.17	12/5/2017	Thermolicer	
			12	7791	3	0.30	0.95	1.00	1.00	12/5/2017	Thermolicer	
			μ	8308	1.3	0.28	1.07	0.57	1.28	-	-	
		CF + FF	1	7903	3	1.55	1.40	1.30	2.14	3/3/2017	H ₂ O ₂	
			8	7767	2	0.25	0.95	0.20	1.00	11/5/2017	Thermolicer	
			11	12983	0	0.75	2.50	2.10	3.52	12/5/2017	Thermolicer	
			μ	9551	1.7	0.85	1.62	1.20	2.22	-	-	
		CF + FF + DL/F	2	6347	5	0.90	0.45	1.76	2.90	13/5/2017	Thermolicer	
			6	7453	3	0.55	0.85	1.05	1.62	12/5/2017	Thermolicer	
			9	6728	3	0.45	1.40	0.50	3.41	11/5/2017	Thermolicer	
			μ	6843	3.7	0.63	0.90	1.10	2.64	-	-	
		CF + FF + DL/F + LS	3	7952	3	0.40	0.60	2.30	2.45	13/5/2017	Thermolicer	
7	9406		1	0.35	0.45	0.40	1.50	6/5/2017	Thermolicer			
10	6739		3	0.10	0.45	1.50	1.86	6/5/2017	Thermolicer			
μ	8032		2.3	0.28	0.50	1.4	1.94	-	-			
3	6/10/17 Rainy, strong current, some wind. 7/10/17 Intermittent rain, some wind. 8/10/17 Sunny, a few clouds, no wind.	CF	4	7688	4	0.40	-	1.67	-	2/10/2017	Optilicer	No lice counting due to treatments. 6/10/17 Thermolicer treatment on Cage 11. Net cleaning 8/10/17 Preparations for Optilicer treatment on cage 1, 5, 6 and 10.
			5	9446	3	1.85	-	1.17	-	12/5/2017	Thermolicer	
			12	7791	6	0.95	-	1.00	-	2/10/2017	Optilicer	
			μ	8308	4.3	1.07	-	1.28	-	-	-	
		CF + FF	1	7903	6	1.40	-	2.14	-	13/5/2017	Thermolicer	
			8	7767	5	0.95	-	1.00	-	11/5/2017	Thermolicer	
			11	12983	3	2.50	-	8.52	-	5/10/2017	Thermolicer	
			μ	9551	4.7	1.62	-	3.89	-	-	-	
		CF + FF + DL/F	2	6347	8	0.45	-	2.90	-	2/10/2017	Optilicer	
			6	7453	6	0.85	-	1.62	-	12/5/2017	Thermolicer	
			9	6728	6	1.40	-	3.41	-	2/10/2017	Optilicer	
			μ	6843	6.7	0.90	-	2.64	-	-	-	
		CF + FF + DL/F + LS	3	10250	1	0.60	-	2.45	-	27/9/2017	Thermolicer	
7	11703		1	0.45	-	1.50	-	27/9/2017	Thermolicer			
10	6739		6	0.45	-	1.86	-	28/9/2017	Thermolicer			
μ	9564		2.7	0.50	-	1.94	-	-	-			

Table S2: definitions of observed cleaner fish behaviours.

Behaviour	Definition
<i>Swimming with salmon</i>	A cleaner fish swims within 2 (of its own) body lengths to one or more salmon for more than 3 seconds.
<i>Feeding on lice</i>	A cleaner fish approaches salmon and takes a louse.
<i>Inspecting salmon</i>	A cleaner fish approaches an individual salmon, swims around it within 1 (of its own) body lengths OR attempts to take a louse (darts in then out without touching salmon).
<i>Alternative feeding</i>	A cleaner fish eats food other than a louse (e.g. net fouling, free-floating organisms, feed).
<i>Avoidance of salmon</i>	A cleaner fish increases swimming speed and/or changes direction towards hide/empty water to avoid being near (within 2 of its own body lengths) salmon.