Supplementary Materials for

Time spent in distinct life-history stages has sex-specific effects on reproductive fitness in wild Atlantic salmon

Kenyon B. Mobley*, Hanna Granroth-Wilding, Mikko Ellmen, Panu Orell, Jaakko Erkinaro, Craig R. Primmer

*Correspondence to: kenyon.mobley@helsinki.fi

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Figure S1. Reproductive success (# offspring, RS) and mating success (# mates, MS) as a function of body weight. Numbers indicate age, either freshwater or sea age, of females (orange) and males (blue). Freshwater age could not be assigned to 25 individuals

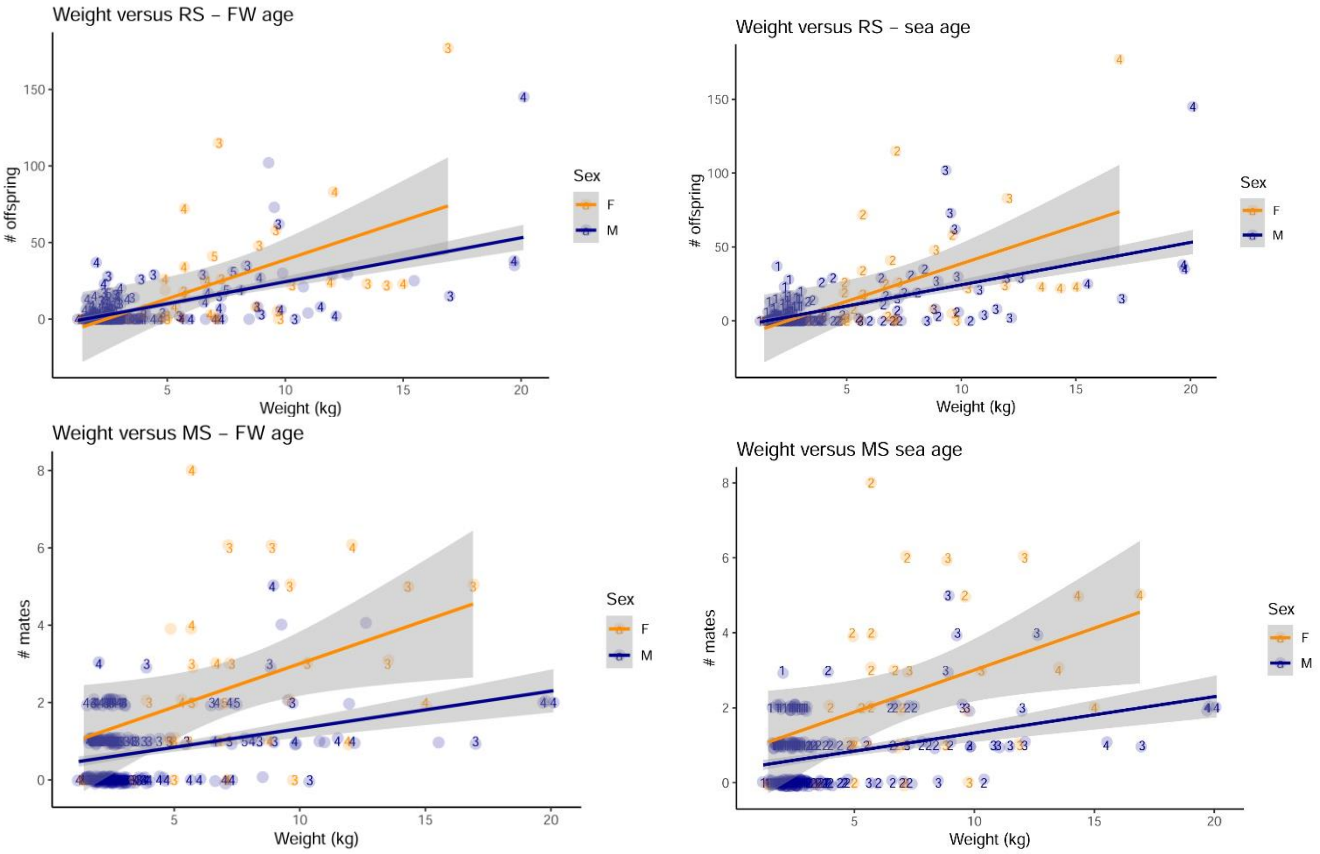

Table S1. Summary of data for freshwater age (FW age) and sea age (in seawinters, SW). Number of individuals (n), means (± SE) for weight, body length, condition, reproductive success (# offspring), and mating success (#mates) are listed (all adults dataset).

	Freshwater age (FW)				Sea age (SW)			
	3	4	5		1	2	3	4
Females								
n	16	12	3		2	20	8	4
Weight (kg)	8.66 ± 0.93	7.63 ± 1.08	4.4 ± 1.63		1.45 ± 0.05	5.87 ± 0.31	9.85 ± 0.57	14.92 ± 0.72
Length (cm)	93.6 ± 3.1	88.5 ± 3.9	74.3 ± 9.9		56.5 ± 0.5	84.3 ± 1.1	98.3 ± 1.3	112.0 ± 1.22
Condition	-0.07 ± 0.26	0.16 ± 0.30	0.65 ± 0.94		2.06 ± 0.33	-0.38 ± 0.15	-0.18 ± 0.30	1.25 ± 0.89
# offspring	33.4 ± 12.1	25.5 ± 7.8	14.0 ± 13.5		--	22.1 ± 6.7	27.0 ± 9.6	61.3 ± 38.6
# mates	2.94 ± 0.50	2.41 ± 0.71	1.0 ± 0.58		--	2.35 ± 0.48	2.75 ± 0.80	3.75 ± 0.75
Males								
n	88	109	14		172	38	16	4
Weight (kg)	3.28 ± 0.25	3.32 ± 0.29	3.08 ± 0.54		2.31 ± 0.04	5.35 ± 0.34	10.30 ± 0.65	18.8 ± 1.09
Length (cm)	69.15 ± 1.20	68.1 ± 1.3	67.5 ± 3.2		63.4 ± 0.3	81.4 ± 1.7	101.7 ± 2.0	120.8 ± 2.2
Condition	-0.06 ± 0.07	-0.01 ± 0.07	-0.11 ± 0.14		0.09 ± 0.03	-0.69 ± 0.12	-0.17 ± 0.30	3.48 ± 1.05
# offspring	4.6 ± 1.0	5.2 ± 1.4	5.6 ± 2.6		2.7 ± 0.4	7.3 ± 1.7	26.6 ± 7.3	60.8 ± 28.2
# mates	0.63 ± 0.08	0.69 ± 0.09	0.71 ± 0.22		0.59 ± 0.06	0.71 ± 0.12	2.81 ± 0.37	1.75 ± 0.25

Table S2. Linear models describing sex differences in sea age (SW) as a function of freshwater age (FW) for adults, breeding adults and first-time spawners datasets. Bold p values indicate significance ($\alpha = 0.05$).

	Effect size	SE	*t*	p
All adults				
SW ~ Sex * FW				
Intercept	4.071	0.598	6.813	**<0.0001**
Sex	-2.669	0.651	-4.105	**<0.0001**
FW	-0.452	0.164	-2.756	**0.0063**
Sex:FW	0.417	0.178	2.343	**0.0200**
Breeding adults				
Sea age ~ Sex + FW				
Intercept	3.034	0.392	7.749	**<0.0001**
Sex	-1.162	0.158	-7.374	**<0.0001**
FW	-0.129	0.103	-1.250	0.2130
First-time spawners				
SW ~ Sex + FW				
Intercept	2.814	0.396	7.105	**<0.0001**
Sex	-1.043	0.167	-6.259	**<0.0001**
FW	-0.108	0.103	-1.053	0.2940

Table S3. Linear models for sex differences in body weight as a function of freshwater age (FW) and sea age (SW) for adults, breeding adults and first-time spawners datasets. Bold p values indicate significance ($\alpha = 0.05$).

	Effect size	SE	*t*	p
All adults				
Weight ~ Sex * FW				
Intercept	14.006	2.795	5.012	**<0.0001**
Sex	-10.633	3.041	-3.497	**<0.0006**
FW	-1.721	0.767	-2.242	**0.0259**
Sex:FW	1.697	0.833	2.037	**0.0427**
Weight ~ Sex + SW				
Intercept	-2.611	0.372	-7.019	**<0.0001**
Sex	0.513	0.281	1.827	0.0689
SW	4.238	0.120	35.312	**<0.0001**
Breeding adults				
Weight ~ Sex + FW				
Intercept	9.401	1.947	4.829	**<0.0001**
Sex	-4.439	0.784	-5.664	**<0.0001**
FW	-0.283	0.514	-0.551	0.5830
Weight ~ Sex + SW				
Intercept	-3.290	0.477	-6.891	**<0.0001**
Sex	0.874	0.349	2.506	**0.0133**
SW	4.543	0.152	29.852	**<0.0001**
First-time spawners				
Weight ~ Sex + FW				
Intercept	7.914	1.970	4.016	**<0.0001**
Sex	-3.681	0.829	-4.438	**<0.0001**
FW	0.103	0.510	-0.201	0.8409
Weight ~ Sex + SW				
Intercept	-3.581	0.470	-7.624	**<0.0001**
Sex	1.159	0.354	3.274	**0.0014**
SW	4.570	0.150	30.393	**<0.0001**

Table S4. Linear models for sex differences in body length as a function of freshwater age (FW) and sea age (SW) for adults, breeding adults and first-time spawners datasets. Bold p values indicate significance ($\alpha = 0.05$).

	Effect size	SE	*t*	p
All adults				
Length ~ Sex + FW				
Intercept	96.877	5.229	18.528	**<0.0001**
Sex	-21.108	2.403	-8.782	**<0.0001**
FW	-1.993	1.319	-1.319	0.132
Length ~ Sex + SW				
Intercept	44.828	1.594	28.11	**<0.0001**
Sex	0.229	1.203	0.19	0.849
SW	18.401	0.514	35.78	**<0.0001**
Breeding adults				
Length ~ Sex + FW				
Intercept	101.677	7.937	12.811	**<0.0001**
Sex	-20.378	3.195	-6.378	**<0.0001**
FW	-2.691	2.094	-1.295	0.2010
Length ~ Sex * SW				
Intercept	56.592	3.995	14.165	**<0.0001**
Sex	-12.294	4.154	-2.960	**0.0036**
SW	13.795	1.514	9.112	**<0.0001**
Sex:SW	5.676	1.648	3.443	**<0.0001**
First-time spawners				
Length ~ Sex + FW				
Intercept	96.806	8.183	11.830	**<0.0001**
Sex	-18.286	3.444	-5.310	**<0.0001**
FW	-2.039	2.118	-0.963	0.3380
Length ~ Sex * SW				
Intercept	56.472	5.022	11.245	**<0.0001**
Sex	-12.176	5.134	-2.372	**0.0192**
SW	13.578	2.027	6.697	**<0.0001**

Sex:SW	5.929	2.118	2.799	**0.0059**

Table S5. Linear models for sex differences in condition as a function of freshwater age (FW) and sea age (SW) for adults, breeding adults and first-time spawners datasets. Bold p values indicate significance ($\alpha = 0.05$).

	Effect size	SE	*t*	p
All adults				
Condition ~ Sex + FW				
Intercept	-0.108	0.326	-0.331	0.7410
Sex	-0.129	0.150	-0.862	0.3890
FW	0.055	0.822	0.669	0.5040
Condition ~ Sex + SW				
Intercept	-0.268	0.233	-1.148	0.2520
Sex	0.117	0.176	0.666	0.5060
SW	0.111	0.075	1.476	0.1410
Breeding adults				
Condition ~ Sex + FW				
Intercept	-0.637	0.473	-1.346	0.1810
Sex	-0.153	0.190	-0.801	0.4240
FW	0.186	0.125	1.489	0.1390
Condition ~ Sex + SW				
Intercept	-0.912	0.302	-3.023	**0.0030**
Sex	0.313	0.220	1.418	0.1583
SW	0.363	0.096	3.772	**0.0002**
First-time spawners				
Condition ~ Sex + FW				
Intercept	-8.030	0.463	-1.734	0.0855
Sex	0.031	0.195	0.159	0.8741
FW	0.186	0.120	1.548	0.1244
Length ~ Sex + SW				
Intercept	-0.986	0.305	-3.229	**0.0016**
Sex	0.447	0.230	1.941	0.0544
SW	0.339	0.098	3.466	**0.0007**

Table S6. Linear models for sex differences in reproductive success (No. offspring) as a function of mating success (No. mates) for adult, breeding adult and first-time spawner datasets. Bold p values indicate significance (α = 0.05).

	Effect size	SE	*t*	p
All adults				
No. Offspring ~ Sex * No. mates				
Intercept	-5.362	3.945	-1.359	0.1753
Sex	4.483	4.143	1.082	0.2803
No. mates	12.908	1.219	10.587	**<0.0001**
Sex * No. mates	-3.065	1.658	-1.849	0.0656
No. offspring ~ Sex + No. mates				
Intercept	-1.265	3.280	-0.386	0.7000
Sex	-0.618	3.106	-0.199	0.8420
No. mates	11.250	0.830	13.557	**<0.0001**
Breeding adults				
No. offspring ~ Sex * No. mates				
Intercept	-9.295	7.053	-1.318	0.190
Sex	3.997	8.217	0.486	0.627
No. mates	13.837	1.978	6.996	**<0.0001**
Sex * No. mates	-1.511	3.303	-0.457	0.648
No. offspring ~ Sex + No. mates				
Intercept	-7.670	6.075	-1.263	0.209
Sex	0.989	4.914	0.201	0.841
No. mates	13.295	1.580	8.416	**<0.0001**
First-time spawners				
No. offspring ~ Sex * No. mates				
Intercept	-8.6890	6.8770	-1.263	0.209
Sex	2.8297	7.8329	0.361	0.718
No. mates	11.7188	1.8909	6.198	**<0.0001**
Sex * No. mates	0.8211	2.9991	0.274	0.785
No. offspring ~ Sex + No. mates				
Intercept	-9.683	5.820	-1.664	0.0986
Sex	4.537	4.724	0.960	0.336
No. mates	12.045	1.462	8.236	**<0.0001**

Table S7. Results for zero-inflated mixture models (GLMM) showing the effect of sex differences in freshwater age (FW) and sea age (SW) on reproductive success and mating success for breeding adults and first-time spawners. Bold p values indicate significance (α = 0.05). All age*sex interactions were included in the initial model but removed if not significant.

	Effect size	SE	*z*	p
REPRODUCTIVE SUCCESS				
FW				
Breeding adults				
No. offspring ~ Sex + FW				
Intercept	-3.82	0.60	-6.32	**<0.0001**
Sex	-1.37	0.24	-5.72	**<0.0001**
FW	0.06	0.16	0.40	0.688
First time spawners				
No. offspring ~ Sex + FW				
Intercept	-4.36	0.63	-6.96	**<0.0001**
Sex	-1.23	0.26	-4.76	**<0.0001**
FW age	0.16	0.16	1.01	0.311
SW				
Breeding adults				
No. offspring ~ Sex + SW				
Intercept	-5.43	0.31	-17.25	**<0.0001**
SW	0.69	0.10	6.86	**<0.0001**
Sex	-0.62	0.23	-2.72	**0.0006**
First-time spawners				
No. offspring ~ Sex + SW				
Intercept	-5.46	0.32	-16.99	**<0.0001**
SW	0.70	0.10	6.77	**<0.0001**
Sex	-0.62	0.24	-2.59	**0.0097**
MATING SUCCESS				
FW				
Breeding adults				
No. mates ~ Sex * FW				
Intercept	-4.64	0.53	-8.682	**<0.0001**
FW	-0.40	0.15	-2.609	0.0102

Sex	-3.12	0.67	-4.693	**<0.0001**
FW*Sex	0.61	0.19	3.298	**0.0013**
First-time spawners				
No. mates ~ Sex * FW				
Intercept	-4.86	0.59	-8.122	**<0.0001**
FW age	-0.34	0.17	-2.026	**0.0451**
Sex	-2.90	0.73	-3.996	**0.0001**
FW*Sex	0.56	0.20	2.776	**0.0064**
SW				
Breeding adults				
No. mates ~ Sex + SW				
Intercept	-6.59	0.18	-36.353	**<0.0001**
SW	0.20	0.06	3.192	**0.0018**
Sex	-0.67	0.13	-5.450	**<0.0001**
First time spawners				
No. mates ~ Sex + SW				
Intercept	-6.54	0.19	-34.985	**<0.0001**
SW	0.20	0.07	3.021	**0.0030**
Sex	-0.69	0.13	-5.350	**<0.0001**