Supplementary information for Spurgin *et al.* "Spatiotemporal variation in lifelong telomere dynamics in a long-term ecological study"

Table S1 Cohort sizes for each hatch year of the Seychelles warbler dataset used in this study. Note that cohort sizes on Cousin are typically small due to the saturated nature of the population.

Cohort	N
1993	24
1994	18
1995	11
1996	46
1997	25
1998	22
1999	45
2000	33
2001	46
2002	73
2003	46
2004	44
2005	90
2006	88
2007	61
2008	47
2009	73
2010	75
2011	62
2012	45
2013	13
2014	53

Table S2 Model selection table for analysis of factors affecting early life telomere length in juvenile Seychelles warblers. Only models that remained in the top model set for model averaging (AICc $\leq$ 6 compared to the top model) are included here.

Model	df	AICc	Delta AICc	Weight
Sex (males) + Insect abundance + Log age + Tarsus	11	-875.68	0.00	0.16
Sex (males) + Density + Insect abundance + Log age + Tarsus	12	-874.18	1.51	0.07
Sex (males) + Body mass + Insect abundance + Log age + Tarsus	12	-873.73	1.95	0.06
Sex (males) + Group Size + Insect abundance + Log age + Tarsus	12	-873.73	1.95	0.06
Helpers + Sex (males) + Insect abundance + Log age + Tarsus	12	-873.72	1.96	0.06
Sex (males) + Log age + Tarsus	10	-873.56	2.12	0.05
Sex (males) + Density + Insect abundance + Log age + Tarsus + Territory quality	13	-872.84	2.84	0.04
Sex (males) + Density + Group Size + Insect abundance + Log age + Tarsus	13	-872.27	3.41	0.03
Helpers + Sex (males) + Density + Insect abundance + Log age + Tarsus	13	-872.25	3.43	0.03
Sex (males) + Body mass + Density + Insect abundance + Log age + Tarsus	13	-872.19	3.49	0.03
Sex (males) + Group Size + Insect abundance + Log age + Tarsus + Territory quality	13	-872.06	3.63	0.03
Sex (males) + Body mass + Insect abundance + Log age + Tarsus + Territory quality	13	-872.05	3.63	0.03
Helpers + Sex (males) + Insect abundance + Log age + Tarsus + Territory quality	13	-872.01	3.67	0.02
Sex (males) + Density + Log age + Tarsus	11	-871.84	3.84	0.02
Sex (males) + Body mass + Group Size + Insect abundance + Log age + Tarsus	13	-871.81	3.87	0.02
Helpers + Sex (males) + Body mass + Insect abundance + Log age + Tarsus	13	-871.78	3.90	0.02
Sex (males) + Log age + Tarsus + Territory quality	11	-871.78	3.90	0.02
Helpers + Sex (males) + Group Size + Insect abundance + Log age + Tarsus	13	-871.71	3.97	0.02
Helpers + Sex (males) + Log age + Tarsus	11	-871.61	4.08	0.02
Sex (males) + Group Size + Log age + Tarsus	11	-871.60	4.09	0.02
Sex (males) + Body mass + Log age + Tarsus	11	-871.53	4.15	0.02
Sex (males) + Density + Group Size + Insect abundance + Log age + Tarsus + Territory quality	14	-871.03	4.65	0.02
Helpers + Sex (males) + Density + Insect abundance + Log age + Tarsus + Territory quality	14	-870.93	4.75	0.01
Insect abundance + Log age + Tarsus	10	-870.48	5.21	0.01
Sex (males) + Body mass + Density + Group Size + Insect abundance + Log age + Tarsus	14	-870.33	5.35	0.01
Sex (males) + Density + Log age + Tarsus + Territory quality	12	-870.29	5.39	0.01
Helpers + Sex (males) + Body mass + Density + Insect abundance + Log age + Tarsus	14	-870.28	5.40	0.01
Helpers + Sex (males) + Density + Group Size + Insect abundance + Log age + Tarsus	14	-870.26	5.42	0.01
Sex (males) + Body mass + Group Size + Insect abundance + Log age + Tarsus + Territory quality	14	-870.18	5.50	0.01
Helpers + Sex (males) + Body mass + Insect abundance + Log age + Tarsus + Territory quality	14	-870.10	5.58	0.01
Helpers + Sex (males) + Group Size + Insect abundance + Log age + Tarsus + Territory quality	14	-870.02	5.66	0.01
Helpers + Sex (males) + Density + Log age + Tarsus	12	-869.92	5.77	0.01
Sex (males) + Density + Group Size + Log age + Tarsus	12	-869.91	5.77	0.01
Sex (males) + Group Size + Log age + Tarsus + Territory quality	12	-869.84	5.84	0.01
Helpers + Sex (males) + Log age + Tarsus + Territory quality	12	-869.82	5.86	0.01

Model	df	AICc	Delta AICc	Weight
Sex (males) + Body mass + Density + Log age + Tarsus	12	-869.81	5.87	0.01
Helpers + Sex (males) + Body mass + Group Size + Insect abundance + Log age + Tarsus	14	-869.79	5.89	0.01
Sex (males) + Body mass + Log age + Tarsus + Territory quality	12	-869.75	5.93	0.01

Table S3 Full model of factors affecting ΔRTL in Seychelles warblers, using longitudinal data.

Variable	Estimate	LCI	UCI
(Intercept)	-0.037	-0.058	-0.016
Age	0.032	-0.012	0.076
Tarsus length	0.047	-0.012	0.106
Number helpers	0.021	-0.037	0.078
Group size	-0.018	-0.072	0.036
Sex (males)	-0.032	-0.090	0.026
Body mass	0.009	-0.044	0.062
Insect abundance	-0.021	-0.066	0.024
Density	-0.042	-0.091	0.008
Territory quality	0.003	-0.045	0.052

Table S4 Model selection table for analysis of factors affecting ΔRTL in Seychelles warblers, using longitudinal data. Only models that remained in the top model set for model averaging (AICc ≤ 6 compared to the top model) are included here. TQ = territory quality.

Model	df	AICc	Delta AICc	Weight
Density + Log age	5	10.32	0.00	0.03
Density + Log age + Tarsus	6	10.53	0.21	0.03
Density + Tarsus	5	11.63	1.31	0.02
Body mass + Density + Log age	6	11.69	1.37	0.02
Sex (males) + Density + Log age + Tarsus	7	11.75	1.43	0.02
Density + Insect abundance + Log age + Tarsus	7	11.88	1.56	0.02
Density + Insect abundance + Log age	6	11.93	1.61	0.02
Log age + Tarsus	5	12.02	1.70	0.01
Log age	4	12.03	1.71	0.01
Helpers + Density + Log age	6	12.20	1.88	0.01
Density + Group size + Log age	6	12.29	1.97	0.01
Sex (males) + Density + Log age	6	12.33	2.01	0.01
Density + Log age + Territory quality	6	12.35	2.03	0.01
Sex (males) + Density + Tarsus	6	12.43	2.11	0.01
Density	4	12.44	2.12	0.01
Helpers + Density + Log age + Tarsus	7	12.49	2.17	0.01
Density + Group size + Log age + Tarsus	7	12.52	2.20	0.01
Body mass + Density + Log age + Tarsus	7	12.57	2.24	0.01
Density + Log age + Tarsus + Territory quality	7	12.59	2.26	0.01
Density + Insect abundance + Tarsus	6	12.78	2.46	0.01
Log age + Territory quality	5	12.92	2.60	0.01
Sex (males) + Density + Insect abundance + Log age + Tarsus	8	13.04	2.72	0.01
Sex (males) + Log age + Tarsus	6	13.07	2.75	0.01
Body mass + Density	5	13.08	2.76	0.01
Log age + Tarsus + Territory quality	6	13.14	2.82	0.01
Tarsus	4	13.28	2.96	0.01
Body mass + Density + Insect abundance + Log age	7	13.29	2.96	0.01
Density + Group size + Tarsus	6	13.45	3.13	0.01
Body mass + Log age	5	13.46	3.14	0.01
Sex (males) + Density + Insect abundance + Tarsus	7	13.52	3.20	0.01
Helpers + Body mass + Density + Log age	7	13.54	3.21	0.01
Body mass + Density + Tarsus	6	13.56	3.24	0.01
Helpers + Density + Tarsus	6	13.60	3.28	0.01
Sex (males) + Body mass + Density + Log age + Tarsus	8	13.61	3.28	0.01
Sex (males) + Body mass + Density + Log age	7	13.65	3.33	0.01

Model	df	AICc	Delta AICc	Weight
Density + Tarsus + Territory quality	6	13.67	3.35	0.01
Sex (males) + Density + Group size + Log age + Tarsus	8	13.69	3.37	0.01
Helpers + Sex (males) + Density + Log age + Tarsus	8	13.72	3.39	0.01
Body mass + Density + Log age + Territory quality	7	13.73	3.41	0.01
Body mass + Density + Group size + Log age	7	13.73	3.41	0.01
Group size + Log age	5	13.78	3.45	0.01
Helpers + Density + Insect abundance + Log age	7	13.79	3.47	0.01
Group size + Log age + Tarsus	6	13.80	3.48	0.01
Sex (males) + Density + Log age + Tarsus + Territory quality	8	13.81	3.49	0.01
Helpers + Density + Insect abundance + Log age + Tarsus	8	13.82	3.50	0.01
Helpers + Density + Group size + Log age	7	13.85	3.52	0.01
Sex (males) + Tarsus	5	13.86	3.54	0.01
Density + Group size + Insect abundance + Log age + Tarsus	8	13.87	3.54	0.01
Density + Group size + Insect abundance + Log age	7	13.90	3.58	0.01
Helpers + Log age	5	13.91	3.59	0.01
Density + Insect abundance + Log age + Tarsus + Territory quality	8	13.92	3.60	0.01
Body mass + Density + Insect abundance + Log age + Tarsus	8	13.93	3.61	0.01
Density + Insect abundance	5	13.93	3.61	0.01
Sex (males) + Density + Insect abundance + Log age	7	13.94	3.62	0.01
Density + Insect abundance + Log age + Territory quality	7	13.94	3.62	0.01
Helpers + Log age + Tarsus	6	13.98	3.65	0.01
Sex (males) + Body mass + Density + Tarsus	7	14.00	3.68	0.01
Insect abundance + Log age + Tarsus	6	14.00	3.68	0.01
Sex (males) + Log age	5	14.04	3.72	0.01
Body mass + Log age + Tarsus	6	14.07	3.75	0.01
Insect abundance + Log age	5	14.07	3.75	0.01
Sex (males) + Density + Group size + Tarsus	7	14.17	3.85	0.01
Density + Group size	5	14.20	3.88	0.00
Helpers + Sex (males) + Density + Log age	7	14.23	3.91	0.00
Helpers + Density + Group size + Log age + Tarsus	8	14.24	3.92	0.00
Helpers + Density + Log age + Territory quality	7	14.25	3.92	0.00
Sex (males) + Log age + Tarsus + Territory quality	7	14.29	3.96	0.00
Sex (males) + Density + Group size + Log age	7	14.32	4.00	0.00
Helpers + Density	5	14.32	4.00	0.00
Density + Group size + Log age + Territory quality	7	14.32	4.00	0.00
Body mass + Log age + Territory quality	6	14.36	4.03	0.00
Sex (males) + Density + Log age + Territory quality	7	14.37	4.05	0.00

Model	df	AICc	Delta AICc	Weight
Null model	3	14.40	4.08	0.00
Helpers + Sex (males) + Density + Tarsus	7	14.41	4.09	0.00
Sex (males) + Density	5	14.42	4.10	0.00
Sex (males) + Density + Tarsus + Territory quality	7	14.48	4.15	0.00
Density + Territory quality	5	14.48	4.16	0.00
Helpers + Body mass + Density + Log age + Tarsus	8	14.52	4.20	0.00
Helpers + Density + Log age + Tarsus + Territory quality	8	14.55	4.23	0.00
Tarsus + Territory quality	5	14.56	4.24	0.00
Body mass + Density + Insect abundance	6	14.56	4.24	0.00
Body mass + Density + Group size + Log age + Tarsus	8	14.57	4.25	0.00
Density + Group size + Log age + Tarsus + Territory quality	8	14.58	4.26	0.00
Density + Group size + Insect abundance + Tarsus	7	14.60	4.28	0.00
Body mass + Density + Log age + Tarsus + Territory quality	8	14.63	4.31	0.00
Group size + Log age + Territory quality	6	14.70	4.38	0.00
Helpers + Density + Insect abundance + Tarsus	7	14.73	4.41	0.00
Sex (males) + Group size + Log age + Tarsus	7	14.75	4.43	0.00
Body mass + Density + Insect abundance + Tarsus	7	14.76	4.43	0.00
Group size + Tarsus	5	14.77	4.45	0.00
Density + Insect abundance + Tarsus + Territory quality	7	14.84	4.51	0.00
Helpers + Log age + Territory quality	6	14.85	4.53	0.00
Insect abundance + Log age + Territory quality	6	14.85	4.53	0.00
Helpers + Body mass + Density	6	14.91	4.59	0.00
Sex (males) + Body mass + Density	6	14.91	4.59	0.00
Insect abundance + Log age + Tarsus + Territory quality	7	14.93	4.61	0.00
Sex (males) + Body mass + Density + Insect abundance + Log age + Tarsus	9	14.94	4.62	0.00
Group size + Log age + Tarsus + Territory quality	7	14.94	4.62	0.00
Sex (males) + Log age + Territory quality	6	14.95	4.63	0.00
Sex (males) + Density + Group size + Insect abundance + Log age + Tarsus	9	14.97	4.65	0.00
Sex (males) + Body mass + Log age + Tarsus	7	14.98	4.65	0.00
Helpers + Sex (males) + Density + Insect abundance + Log age + Tarsus	9	14.99	4.67	0.00
Helpers + Group size + Log age	6	15.02	4.70	0.00
Sex (males) + Insect abundance + Log age + Tarsus	7	15.02	4.70	0.00
Helpers + Density + Group size + Tarsus	7	15.02	4.70	0.00
Helpers + Sex (males) + Log age + Tarsus	7	15.03	4.71	0.00
Body mass + Density + Group size	6	15.05	4.73	0.00
Sex (males) + Density + Insect abundance + Log age + Tarsus + Territory quality	9	15.10	4.77	0.00
Body mass	4	15.11	4.79	0.00

Model	df	AICc	Delta AICc	Weight
Helpers + Body mass + Density + Insect abundance + Log age	8	15.11	4.79	0.00
Helpers + Log age + Tarsus + Territory quality	7	15.12	4.80	0.00
Body mass + Density + Territory quality	6	15.13	4.80	0.00
Sex (males) + Body mass + Density + Insect abundance + Tarsus	8	15.16	4.84	0.00
Body mass + Log age + Tarsus + Territory quality	7	15.18	4.86	0.00
Insect abundance + Tarsus	5	15.19	4.87	0.00
Sex (males) + Group size + Tarsus	6	15.23	4.91	0.00
Sex (males) + Tarsus + Territory quality	6	15.24	4.92	0.00
Helpers + Tarsus	5	15.24	4.92	0.00
Sex (males) + Density + Group size + Insect abundance + Tarsus	8	15.25	4.93	0.00
Body mass + Tarsus	5	15.26	4.94	0.00
Sex (males) + Body mass + Density + Insect abundance + Log age	8	15.28	4.96	0.00
Helpers + Group size + Log age + Tarsus	7	15.28	4.96	0.00
Helpers + Body mass + Log age	6	15.30	4.98	0.00
Body mass + Density + Insect abundance + Log age + Territory quality	8	15.30	4.98	0.00
Body mass + Density + Group size + Insect abundance + Log age	8	15.33	5.01	0.00
Helpers + Sex (males) + Density + Group size + Log age + Tarsus	9	15.35	5.03	0.00
Body mass + Group size + Log age	6	15.35	5.03	0.00
Helpers + Body mass + Density + Group size + Log age	8	15.37	5.05	0.00
Helpers + Density + Group size + Insect abundance + Log age	8	15.39	5.07	0.00
Sex (males) + Body mass + Log age	6	15.42	5.10	0.00
Territory quality	4	15.45	5.13	0.00
Body mass + Density + Group size + Tarsus	7	15.45	5.13	0.00
Helpers + Sex (males) + Density + Insect abundance + Tarsus	8	15.48	5.15	0.00
Helpers + Sex (males) + Body mass + Density + Log age	8	15.48	5.16	0.00
Helpers + Density + Group size	6	15.49	5.16	0.00
Body mass + Insect abundance + Log age	6	15.50	5.18	0.00
Density + Group size + Tarsus + Territory quality	7	15.51	5.18	0.00
Sex (males) + Body mass + Tarsus	6	15.51	5.19	0.00
Helpers + Body mass + Density + Tarsus	7	15.51	5.19	0.00
Helpers + Density + Group size + Insect abundance + Log age + Tarsus	9	15.53	5.21	0.00
Helpers + Sex (males) + Body mass + Density + Log age + Tarsus	9	15.54	5.22	0.00
Sex (males) + Density + Insect abundance + Tarsus + Territory quality	8	15.58	5.26	0.00
Helpers + Body mass + Density + Log age + Territory quality	8	15.59	5.27	0.00
Sex (males) + Body mass + Density + Group size + Log age + Tarsus	9	15.61	5.29	0.00
Body mass + Density + Tarsus + Territory quality	7	15.61	5.29	0.00
Helpers + Density + Tarsus + Territory quality	7	15.64	5.32	0.00

Model	df	AICc	Delta AICc	Weight
Helpers + Sex (males) + Density + Group size + Tarsus	8	15.65	5.33	0.00
Sex (males) + Body mass + Density + Log age + Tarsus + Territory quality	9	15.68	5.35	0.00
Density + Group size + Insect abundance	6	15.69	5.37	0.00
Sex (males) + Body mass + Density + Log age + Territory quality	8	15.70	5.38	0.00
Sex (males) + Body mass + Density + Group size + Log age	8	15.70	5.38	0.00
Sex (males) + Insect abundance + Tarsus	6	15.74	5.42	0.00
Sex (males) + Density + Group size + Log age + Tarsus + Territory quality	9	15.76	5.44	0.00
Group size + Insect abundance + Log age + Tarsus	7	15.77	5.45	0.00
Body mass + Density + Group size + Log age + Territory quality	8	15.78	5.45	0.00
Group size	4	15.78	5.46	0.00
Helpers + Sex (males) + Density + Log age + Tarsus + Territory quality	9	15.79	5.47	0.00
Helpers + Density + Insect abundance	6	15.79	5.47	0.00
Sex (males) + Group size + Log age	6	15.81	5.48	0.00
Group size + Insect abundance + Log age	6	15.81	5.49	0.00
Helpers + Sex (males) + Density + Insect abundance + Log age	8	15.82	5.49	0.00
Helpers + Density + Insect abundance + Log age + Territory quality	8	15.82	5.50	0.00
Helpers + Sex (males) + Tarsus	6	15.83	5.51	0.00
Body mass + Group size + Log age + Tarsus	7	15.85	5.53	0.00
Helpers + Body mass + Density + Insect abundance + Log age + Tarsus	9	15.87	5.55	0.00
Helpers + Density + Insect abundance + Log age + Tarsus + Territory quality	9	15.88	5.56	0.00
Sex (males) + Body mass + Density + Group size + Tarsus	8	15.89	5.57	0.00
Helpers + Density + Group size + Log age + Territory quality	8	15.89	5.57	0.00
Helpers + Sex (males) + Density + Group size + Log age	8	15.90	5.58	0.00
Sex (males) + Density + Insect abundance	6	15.91	5.58	0.00
Density + Group size + Insect abundance + Log age + Territory quality	8	15.91	5.59	0.00
Density + Group size + Insect abundance + Log age + Tarsus + Territory quality	9	15.91	5.59	0.00
Sex (males) + Density + Group size + Insect abundance + Log age	8	15.93	5.60	0.00
Helpers + Sex (males) + Body mass + Density + Tarsus	8	15.93	5.61	0.00
Helpers + Sex (males) + Log age	6	15.93	5.61	0.00
Body mass + Density + Group size + Insect abundance + Log age + Tarsus	9	15.94	5.61	0.00
Helpers + Insect abundance + Log age	6	15.95	5.62	0.00
Helpers + Insect abundance + Log age + Tarsus	7	15.95	5.63	0.00
Sex (males) + Density + Insect abundance + Log age + Territory quality	8	15.96	5.63	0.00
Density + Insect abundance + Territory quality	6	15.97	5.65	0.00
Body mass + Density + Insect abundance + Log age + Tarsus + Territory quality	9	15.98	5.66	0.00
Sex (males) + Group size + Log age + Tarsus + Territory quality	8	16.00	5.68	0.00
Helpers + Body mass + Log age + Tarsus	7	16.02	5.70	0.00

Model	df	AICc	Delta AICc	Weight
Sex (males) + Insect abundance + Log age + Tarsus + Territory quality	8	16.04	5.72	0.00
Body mass + Insect abundance + Log age + Tarsus	7	16.06	5.73	0.00
Sex (males) + Body mass + Density + Tarsus + Territory quality	8	16.06	5.73	0.00
Helpers + Group size + Tarsus	6	16.06	5.74	0.00
Group size + Tarsus + Territory quality	6	16.08	5.76	0.00
Sex (males) + Insect abundance + Log age	6	16.09	5.76	0.00
Helpers + Group size + Log age + Territory quality	7	16.09	5.77	0.00
Helpers + Density + Group size + Insect abundance + Tarsus	8	16.10	5.78	0.00
Body mass + Territory quality	5	16.14	5.82	0.00
Helpers + Sex (males) + Group size + Log age + Tarsus	8	16.15	5.82	0.00
Sex (males) + Body mass + Log age + Tarsus + Territory quality	8	16.17	5.85	0.00
Sex (males) + Density + Group size	6	16.21	5.89	0.00
Sex (males) + Density + Group size + Tarsus + Territory quality	8	16.23	5.91	0.00
Density + Group size + Territory quality	6	16.24	5.92	0.00
Helpers + Body mass + Log age + Territory quality	7	16.25	5.93	0.00
Insect abundance + Tarsus + Territory quality	6	16.26	5.94	0.00
Body mass + Group size + Log age + Territory quality	7	16.27	5.95	0.00
Helpers	4	16.27	5.95	0.00
Helpers + Sex (males) + Log age + Tarsus + Territory quality	8	16.28	5.96	0.00
Helpers + Sex (males) + Density + Log age + Territory quality	8	16.28	5.96	0.00
Body mass + Insect abundance + Log age + Territory quality	7	16.28	5.96	0.00
Helpers + Body mass + Density + Group size + Log age + Tarsus	9	16.31	5.99	0.00
Helpers + Density + Group size + Log age + Tarsus + Territory quality	9	16.31	5.99	0.00
Sex (males) + Body mass + Log age + Territory quality	7	16.32	5.99	0.00
Helpers + Sex (males) + Density	6	16.32	6.00	0.00

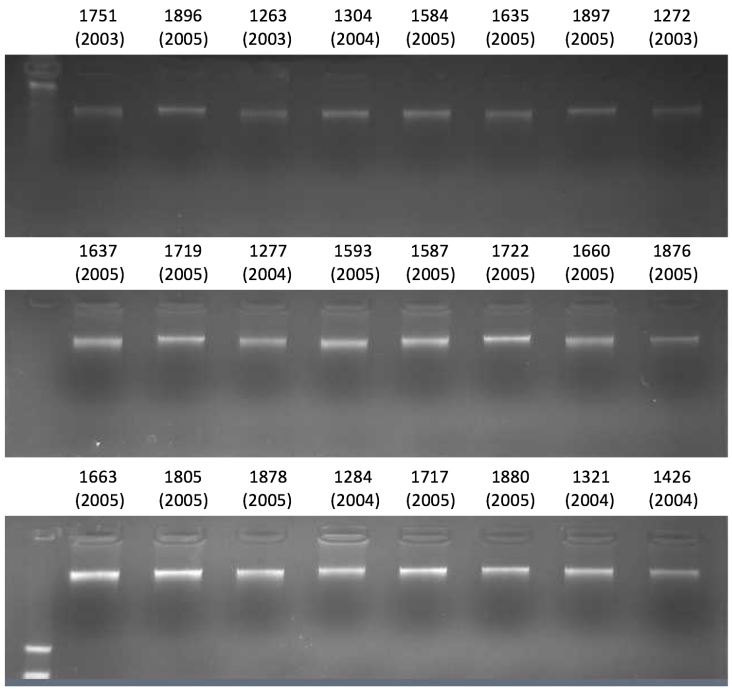

Figure S1 Examples of DNA extractions from older Seychelles warbler samples (sample year in brackets). We found no evidence for differences in DNA integrity with sample age.

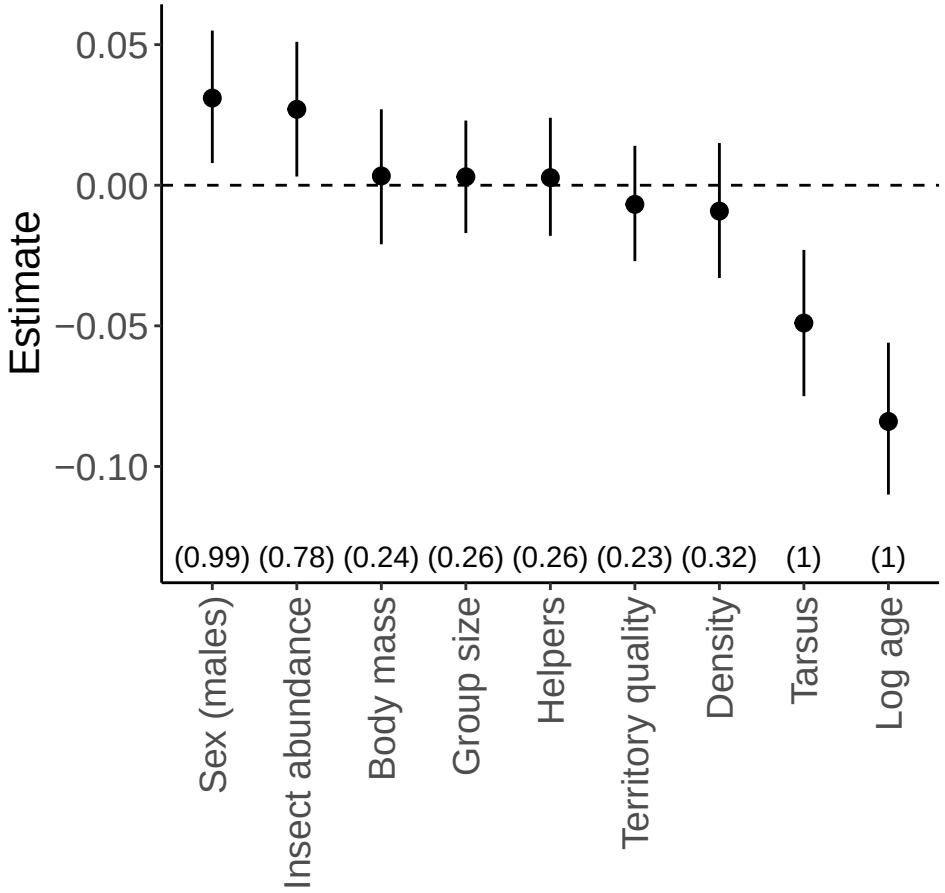

Figure S2 Model averaged estimates and 95% cofidence intervals for social and ecological environmental variables in relation to RTL in Seychelles warblers.

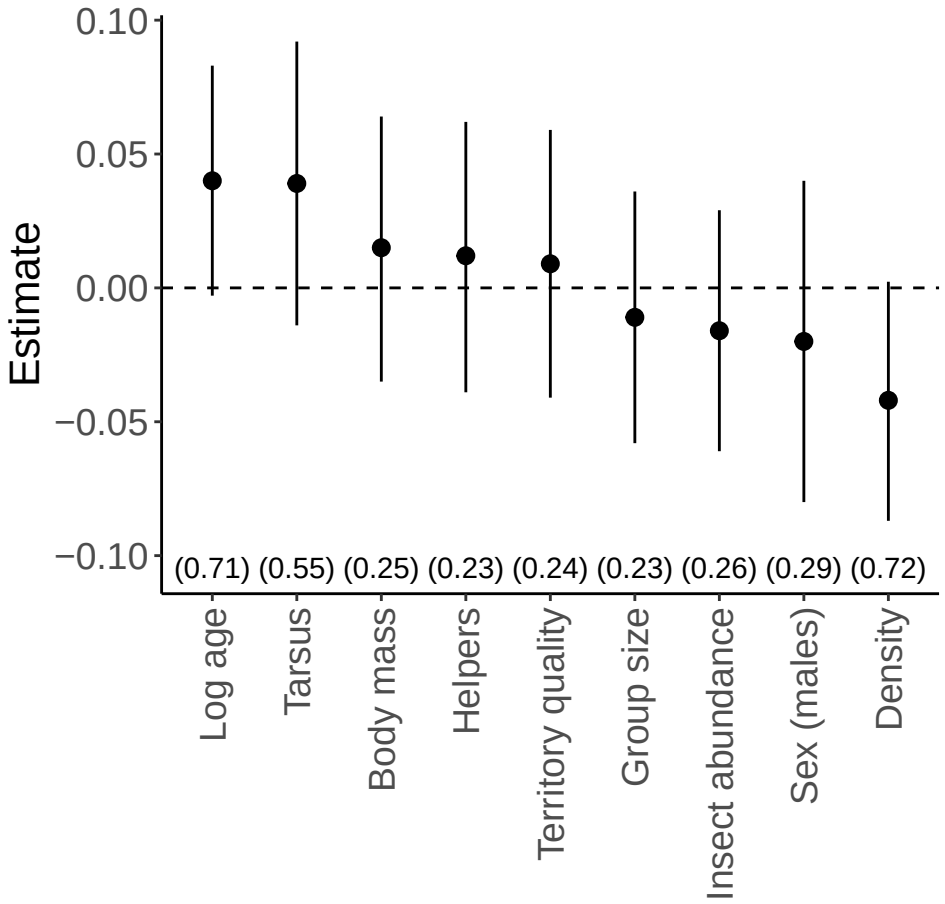

Figure S3 Model averaged estimates and 95% cofidence intervals for social and ecological environmental variables in relation to ΔRTL in Seychelles warblers, using longitudinal data.