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Supplementary material

Appendix 1.

Table A1. Comparison of linear and quadratic models of long-term (1981–2016) trends in reproduction, the mean acorn crop, and weather variables. Model weights based on comparison of AIC_c values for the respective linear and quadratic models; in no case did the quadratic model garner greater support than the linear model.

	Linear model		Quadratic model		
Dependent variable	YEAR effect size (*P*-value)	Model weight	YEAR effect size (*P*-value)	$YEAR^2$ effect size (*P*-value)	Model weight
Mean LED	-0.033 ± 0.085 (0.70)	0.72	-28.9 ± 36.7 (0.44)	0.007 ± 0.009 (0.44)	0.28
Clutch size	0.010 ± 0.007 (0.13)	0.78	-0.57 ± 2.99 (0.85)	0.0001 ± 0.0007 (0.85)	0.22
Young fledged	0.013 ± 0.007 (0.06)	0.50	4.50 ± 2.88 (0.13)	-0.001 ± 0.001 (0.13)	0.50
Young surviving to February	0.008 ± 0.007 (026)	0.78	0.946 ± 3.218 (0.77)	-0.0002 ± 0.0008 (0.77)	0.22
Mean acorn crop	0.002 ± 0.012 (0.85)	0.73	3.62 ± 5.07 (0.48)	-0.0009 ± 0.0012 (0.48)	0.27
Mean maximum winter temperature	-0.002 ± 0.018 (0.91)	0.58	-10.5 ± 7.73 (0.18)	0.003 ± 0.002 (0.18)	0.42
Mean minimum winter temperature	0.017 ± 0.014 (0.23)	0.78	0.98 ± 6.10 (0.87)	-0.0002 ± 0.0015 (0.87)	0.22
Winter rainfall	-0.32 ± 0.28 (0.26)	0.78	-3.90 ± 122.6 (0.97)	0.0009 ± 0.0307 (0.98)	0.22
Mean maximum early spring temperature	0.019 ± 0.034 (0.57)	0.76	-8.02 ± 14.9 (0.59)	0.0020 ± 0.0004 (0.59)	0.24
Mean minimum early spring temperature	0.002 ± 0.014 (0.89)	0.78	1.23 ± 6.22 (0.85)	-0.0003 ± 0.0016 (0.85)	0.22
Early spring rainfall	-0.14 ± 0.14 (0.31)	0.70	-51.2 ± 60.4 (0.38)	0.014 ± 0.015 (0.38)	0.30

Table A2. Effect size (± standard error) and *P*-values (in parentheses) of variables testing within- and among-female effects on clutch size, young fledged, and young surviving to February. Analyses by linear mixed-effects models identical to Table 2, but including group size, territory quality, and whether there was a turnover in breeder composition or not as fixed factors. Statistically significant values in bold.

		Dependent variable		
Analysis	Variable	Clutch size	Young fledged	Young surviving to February
1	Within-female lay date (± SE)	**-0.005 ± 0.002 (0.01)**	**-0.010 ± 0.003 (<0.001)**	**-0.009 ± 0.002 (<0.001)**
	Among-female mean lay date (± SE)	-0.003 ± 0.005 (0.56)	**-0.031 ± 0.005 (<0.001)**	**-0.018 ± 0.004 (<0.001)**
	Group size (± SE)	0.042 ± 0.024 (0.08)	**0.094 ± 0.030 (0.002)**	**0.081 ± 0.023 (<0.001)**
	Territory quality (± SE)	0.202 ± 0.188 (0.28)	-0.046 ± 0.222 (0.83)	0.258 ± 0.171 (0.13)
	Breeder turnover (±SE)	**-0.259 ± 0.103 (0.01)**	**-0.325 ± 0.129 (0.01)**	**-0.295 ± 0.100 (0.004)**
	Female identity random effects (variance)	**0.223 (<0.001)**	**0.172 (<0.001)**	**0.050 (<0.001)**
	Residual random effects (variance ± SD)	0.752	1.720	1.101
	N observations (*N* females)	602 (228)	762 (257)	762 (257)
2	Difference between within- and among-female lay date	0.002 ± 0.005 (0.69)	**-0.021 ± 0.006 (<0.001)**	**-**0.008 ± 0.005 (0.07)
	Group size (± SE)	0.042 ± 0.024 (0.08)	**0.094 ± 0.030 (0.002)**	**0.081 ± 0.023 (<0.001)**
	Territory quality (± SE)	0.202 ± 0.188 (0.28)	-0.046 ± 0.222 (0.83)	0.258 ± 0.171 (0.13)
	Breeder turnover (±SE)	**-0.259 ± 0.103 (0.01)**	**-0.325 ± 0.129 (0.01)**	**-0.295 ± 0.100 (0.004)**