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Appendix 1

Table A1. Correlation coefficients between breeding success (chicks per female), brood frequency (broods per female) and brood size (chicks per brood) and the average daily minimum temperatures of spring-early summer in the Eidsberg sub-area 1985-2017.

	Capercaillie			Black grouse		
	Breeding success	Brood frequency	Brood size	Breeding success	Brood frequency	Brood size
April	0.40	0.40	0.23	0.43	0.50	0.28
May	0.40	0.43	0.26	0.56	0.28	0.57
April-May	0.49	0.51	0.30	0.60	0.50	0.50
June	0.44	0.38	0.38	0.44	0.45	0.34
April-May-June	0.56	0.55	0.38	0.64	0.56	0.52

Threshold values: $r = 0.34, p = 0.05$; $r = 0.44, p = 0.01$; $r = 0.54, p = 0.001$

Table A2. Correlation coefficients between focal variables in the Eidsberg-Varaldskogen comparison.

Eidsberg - Varaldskogen	<i>r</i>	<i>p</i>	<i>n</i>
April _{min} temp	0.94	<0.0001	33
May _{min} temp	0.90	<0.0001	33
June _{min} temp	0.89	<0.0001	33
April-May _{min} temp	0.90	<0.0001	33
April-May-June _{min} temp	0.90	<0.0001	33

Small rodents	0.45	0.03	23
Larvae	0.48	0.04	19
Capercaillie breeding success	0.60	0.0002	33
Capercaillie brood frequency	0.41	0.02	33
Capercaillie brood size	0.40	0.02	33
Black grouse breeding success	0.37	0.03	33
Black grouse brood frequency	0.04	0.81	33
Black grouse brood size	0.25	0.16	33

Table A3. Comparison of breeding success, brood frequency and brood size of capercaillie and black grouse in the Eidsberg sub-area during the early period of no feeding (1985-1995) and the latter period of diversionary feeding (1996-2017). Differences are shown as relative change, i.e. ratios of feeding/no feeding values. Original (uncorrected) values are shown to the left and values corrected for increasing temperature to the right. Confidence intervals and significance tests are based on log-ratio values. Statistically different values at $p < 0.05$ are highlighted with bold letters and shading.

<i>Eidsberg series</i>		No feeding (n = 11 yrs)	Feeding (n = 22 yrs)	Feeding corrected for temp	Feeding / no feeding ratio					Feeding / no feeding ratio corrected for spring and summer temperature				
					Ratio \dot{x}	95% CI	<i>r</i>	<i>t</i>	<i>p</i>	Ratio \dot{x}	95% CI	$r_p^{(b)}$	<i>t</i>	<i>p</i>
CAP	Breeding success	1.41	2.44	2.04	1.73	1.29-2.31	0.57	3.84	<0.001	1.45	0.94-2.22	0.31	1.76	0.089
	Brood frequency	0.58	0.82	0.71	1.40	1.17-1.81	0.61	4.32	<0.001	1.23	1.01-1.46	0.35	2.07	0.047
	Brood size	2.67	3.04	2.64	1.14	0.96-1.34	0.27	1.58	0.123	0.99	0.78-1.26	-0.01	-0.05	0.961
BG	Breeding success	1.90	3.16	2.72	1.66	1.38-2.00	0.71	5.62	<0.001	1.43	1.05-1.92	0.37	2.15	0.037
	Brood frequency	0.68	0.82	0.74	1.20	1.07-1.39	0.51	3.31	0.002	1.09	0.92-1.28	0.19	1.07	0.293
	Brood size	2.89	3.97	3.81	1.37	1.19-1.58	0.63	4.57	<0.001	1.32	1.07-1.64	0.44	2.69	0.012

^(a) Absolute values after temperature has been controlled for in multiple regression.

^(b) Partial correlation after controlling for spring and early summer temperatures (April, May, June).

Table A4. Comparison of breeding success, brood frequency and brood size of capercaillie and black grouse in the Eidsberg sub-area relative to the Varaldskogen control area during the early period of no feeding (1985-1995) and the latter period of diversionary feeding (1996-2017). Means are based on annual pairwise ratios of Eidsberg/Varaldskogen, and the relative change is calculated as the ratio of the feeding period versus the no-feeding period.

<i>Eidsberg / Varaldskogen ratio</i>		No feeding (n = 11 yrs)	Feeding (n = 22 yrs)	Feeding / no feeding ratio Relative change after feeding				
				$\bar{x}^{(a)}$	$\bar{x}^{(a)}$	$\bar{x}^{(b)}$	95% CI	r
Caper- caillie	Breeding success	1.51	1.91	1.26	0.94-1.68	0.28	1.62	0.116
	Brood frequency	1.38	1.65	1.19	0.94-1.52	0.26	1.49	0.147
	Brood size	1.09	1.14	1.04	0.86-1.26	0.08	0.44	0.659
Black grouse	Breeding success	1.07	1.54	1.44	1.13-1.84	0.48	3.03	0.005
	Brood frequency	1.24	1.38	1.11	0.88-1.40	0.16	0.90	0.376
	Brood size	0.86	1.13	1.31	1.11-1.54	0.52	3.35	0.002

(a) Means of annual pairwise ratios between Eidsberg and Varaldskogen.

(b) Relative difference (Feeding/No-feeding ratio) after feeding started in Eidsberg sub-area.

Table A5. Yearly and average breeding success, brood frequency and brood size of capercaillie and black grouse in feeding and control areas, compared by yearly and average ratios. Shaded areas are values significant at $p < 0.05$.

	Feeding	Control	Year	Feeding area						Control area						Feeding/control ratio		
				No. females	No. broods	No. chicks	Breeding success	Brood freq.	Brood size	No. females	No. broods	No. chicks	Breeding success	Brood freq.	Brood size	Breeding success	Brood freq.	Brood size
Capercaillie ^(a)	Marker	Rakkestad	2003	4	2	5	1.25	0.50	2.50	1	1	3	3.00	1.00	3.00	0.42	0.50	0.83
			2004	4	4	12	3.00	1.00	3.00	3	2	7	2.33	0.67	3.50	1.29	1.49	0.86
			2005	4	4	12	3.00	1.00	3.00	5	4	10	2.00	0.80	2.50	1.50	1.25	1.20
			Average 2003-2005						2.42	0.83	2.83				2.44	0.82	3.00	0.99
	Rakkestad	Marker	2006	5	5	14	2.80	1.00	2.80	10	6	15	1.50	0.60	2.50	1.87	1.67	1.12
			2007	6	5	12	2.00	0.83	2.40	2	0	0	0	-	-	-	-	-
			2008	2	2	4	2.00	1.00	2.00	9	4	18	2.00	0.44	4.50	1.00	2.27	0.44
			Average 2006-2008						2.27	0.94	2.40				1.17	0.35	3.50	1.94
	Combined average 2003-2008 (n = 5) ^(b)						2.35	0.89	2.62				1.81	0.59	3.20	1.30	1.44	0.82
	Black grouse	Marker	Rakkestad	2003	5	4	17	3.40	0.80	4.25	11	6	12	1.09	0.55	2.00	3.12	1.45
2004				6	5	17	2.83	0.83	3.40	7	4	9	1.29	0.57	2.25	2.19	1.46	1.51
2005				6	6	19	3.17	1.00	3.17	10	8	19	1.90	0.80	2.38	1.67	1.25	1.33
Average 2003-2005							3.13	0.88	3.61				1.43	0.64	2.21	2.18	1.39	1.63
Rakkestad		Marker	2006	9	8	28	3.11	0.89	3.50	11	8	33	3.00	0.73	4.13	1.04	1.22	0.85
			2007	12	11	33	2.75	0.92	3.00	5	4	15	3.00	0.80	3.75	0.92	1.15	0.80
			2008	8	7	32	4.00	0.88	4.57	5	3	10	2.00	0.60	3.33	2.00	1.47	1.37
			Average 2006-2008						3.29	0.90	3.69				2.67	0.71	3.74	1.23
Combined average 2003-2008 (n = 6)						3.21	0.89	3.65				2.05	0.68	2.97	^(c) 1.57	^(d) 1.33	^(e) 1.26	
Pooled		Marker	Rakkestad	2003	9	6	22	2.44	0.67	3.68	12	7	15	1.25	0.58	2.14	1.95	1.16
	2004			10	9	29	2.90	0.90	3.22	10	6	16	1.60	0.60	2.67	1.81	1.50	1.21
	2005			10	10	31	3.10	1.00	3.10	15	12	29	2.93	0.80	2.42	1.06	1.25	1.28
	Average 2003-2005						2.81	0.86	3.33				1.93	0.66	2.41	1.46	1.30	1.38
	Rakkestad	Marker	2006	14	13	42	3.00	0.93	3.23	21	14	48	2.29	0.67	3.43	1.31	1.39	0.94
			2007	18	16	45	2.50	0.89	2.81	7	4	15	2.14	0.57	3.75	1.17	1.56	0.75
			2008	10	9	36	3.60	0.90	4.00	14	7	28	2.00	0.50	4.00	1.80	1.80	1.00
			Average 2006-2008						3.03	0.91	3.35				2.14	0.58	3.73	1.42
	Combined average 2003-2008 (n = 6)						2.92	0.88	3.34				2.04	0.62	3.07	^(f) 1.43	^(g) 1.44	^(h) 1.11

Capercaillie: ^(a) Too few birds for statistical inference.

^(b) n = 5, due to lack of broods in 2007.

One-sample t-tests of log-ratio values $\neq 0$ for combined time period (n = 6):

Black grouse: ^(c) Breeding success: $\bar{x} = 0.22, 0.083 \text{ SE}, t = 2.70, p = 0.043$

^(d) Brood frequency: $\bar{x} = 0.12, 0.019 \text{ SE}, t = 6.41, p = 0.001$

^(e) Brood size: $\bar{x} = 0.10, 0.065 \text{ SE}, t = 1.53, p = 0.187$

Pooled sample:

^(f) Breeding success: $\bar{x} = 0.17, 0.046 \text{ SE}, t = 3.71, p = 0.014$

^(g) Brood frequency: $\bar{x} = 0.15, 0.028 \text{ SE}, t = 5.46, p = 0.003$

^(h) Brood size: $\bar{x} = 0.05, 0.051 \text{ SE}, t = 0.89, p = 0.414$

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Table A6. Correlation coefficient between breeding success and small rodent index at Eidsberg sub-area, and between the effect of feeding on breeding performances (Eidsberg/Varaldskogen ratio) and small rodent index (Eidsberg).

		Capercaillie (r)	Black grouse (r)
Correlation - Breeding success Eidsberg vs small rodent index (Eidsberg)		0.60 ^(b)	0.38 ^(c)
Correlation Effect of feeding (Eidsberg/Varaldskogen) ^(a) vs small rodent index (Eidsberg)	Breeding success	0.10	-0.18
	Brood frequency	-0.21	-0.38 ^(d)
	Brood size	0.32	0.11

(a) Log-ratio breeding parameter Eidsberg/Varaldskogen

(b) $t=3.40$, $n=23$, $p=0.003$

(c) $t=1.90$, $n=23$, $p=0.070$

(d) $t=-1.51$, $n=16$, $p=0.150$