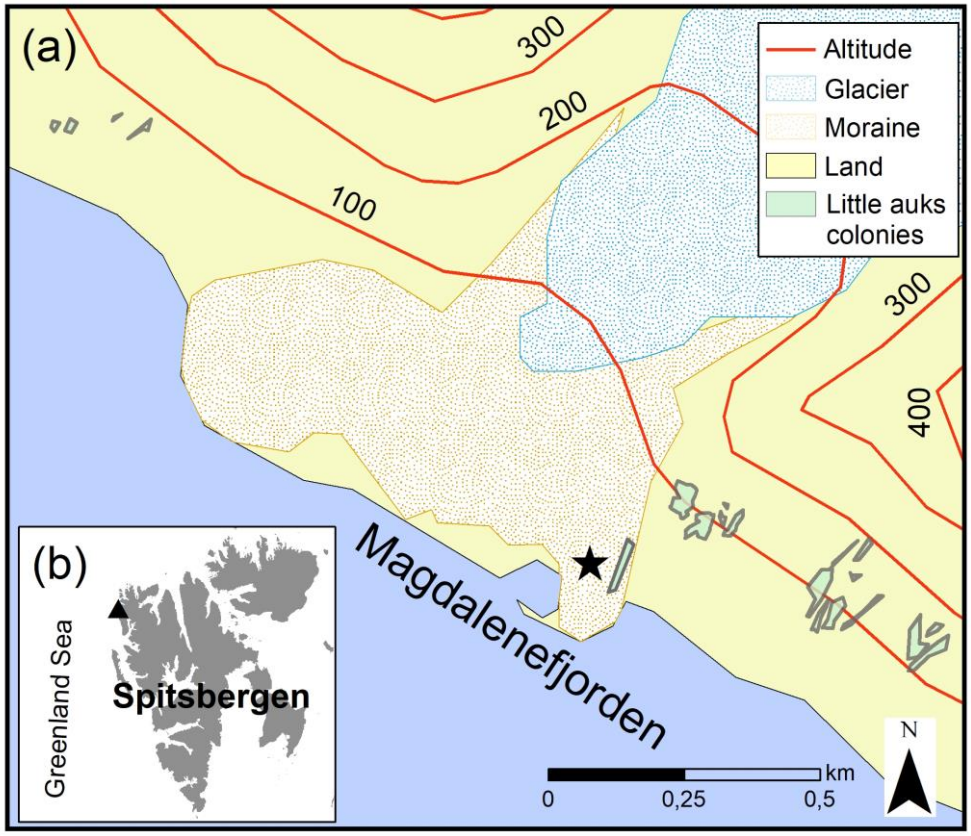
Supplementary material for: Wojczulanis-Jakubas K., Wąż P. & Jakubas D. 2020. Living in the Arctic: diel activity rhythm of a small diving seabird in conditions of the midnight sun. *Polar Research 39.* Correspondence: Katarzyna Wojczulanis-Jakubas, Department of Vertebrate Ecology and Zoology, Faculty of Biology, Wita University of Gdańsk, Stwosza 59, 80-308 Gdańsk, Poland. E-mail: biokwj@univ.gda.pl

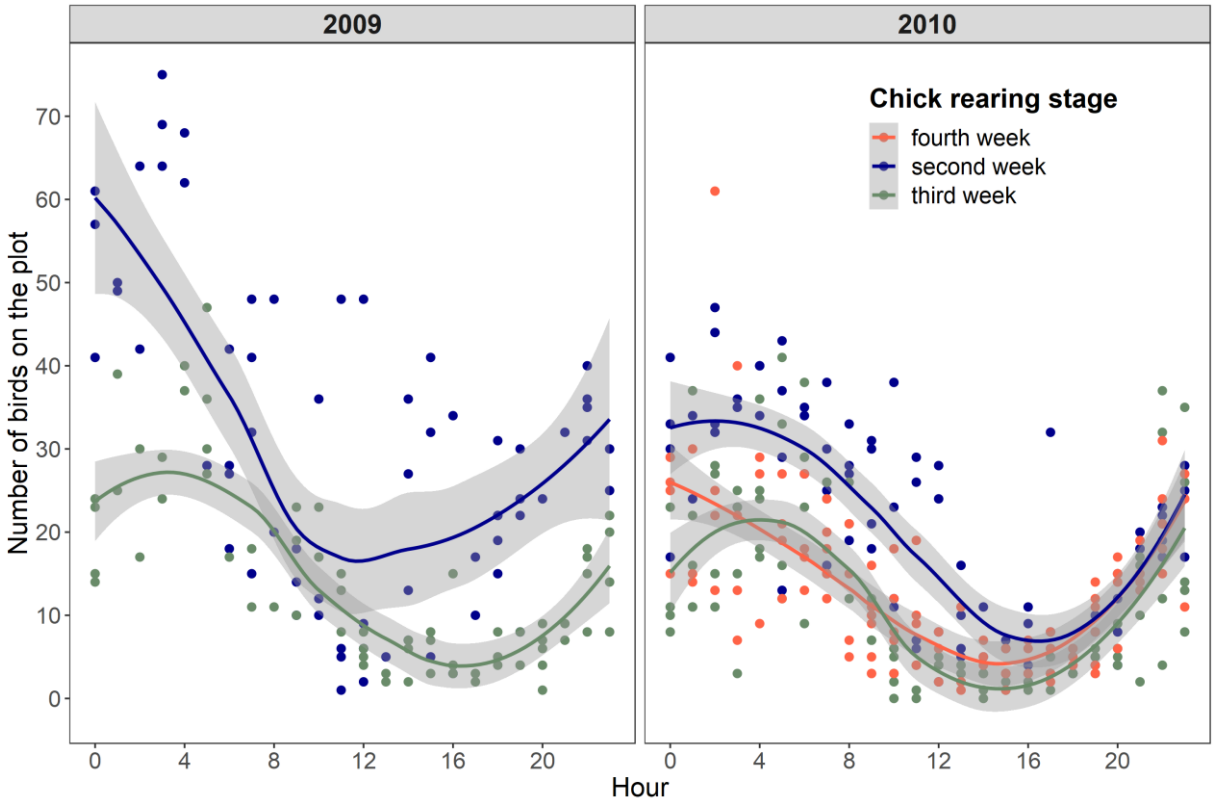


Supplementary Fig. S1. Study area with denoted little auk colony patches, including studied patch (star) (a), and location of the study area on Spitsbergen (triangle) (b). Map data © Norwegian Polar Institute version: January 2015. Location of little auk colonies from Keslinka et al. (2019).

Reference:

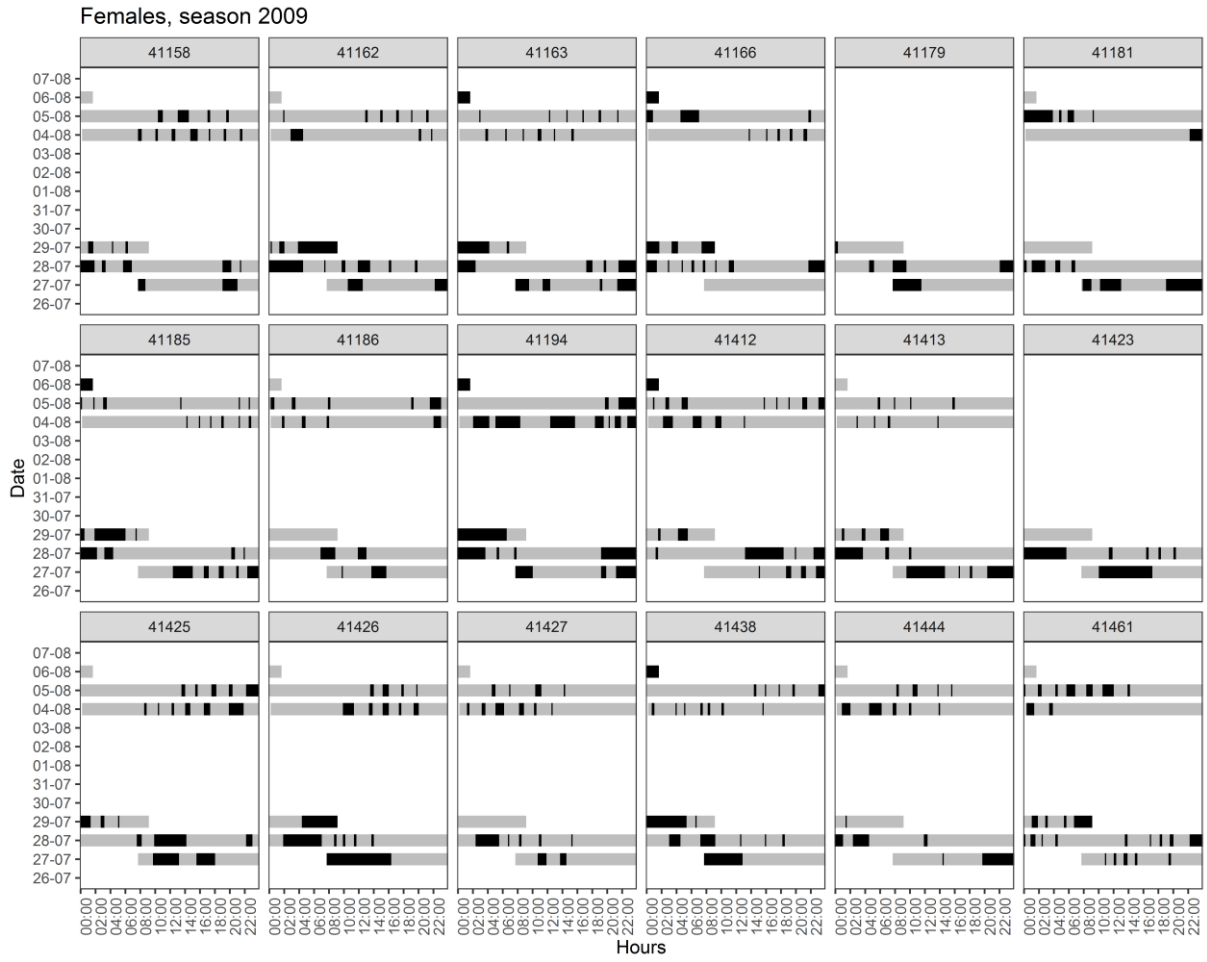
Keslinka L.K., Wojczulanis-Jakubas K., Jakubas D. & Neubauer G. 2019. Determinants of the little auk (*Alle alle*) breeding colony location and size in W and NW coast of Spitsbergen. *PLoS ONE 14*, e0212668, doi: 10.1371/journal.pone.0212668.

Supplementary Fig. S2. Colony attendance pattern of the little auk, expressed as the number of birds on the colony plot observed during 48-h observations, performed at two and three stages of the chick-rearing period and in two breeding seasons, respectively. Lines represent loess fit for particular weeks of the chick-rearing period.

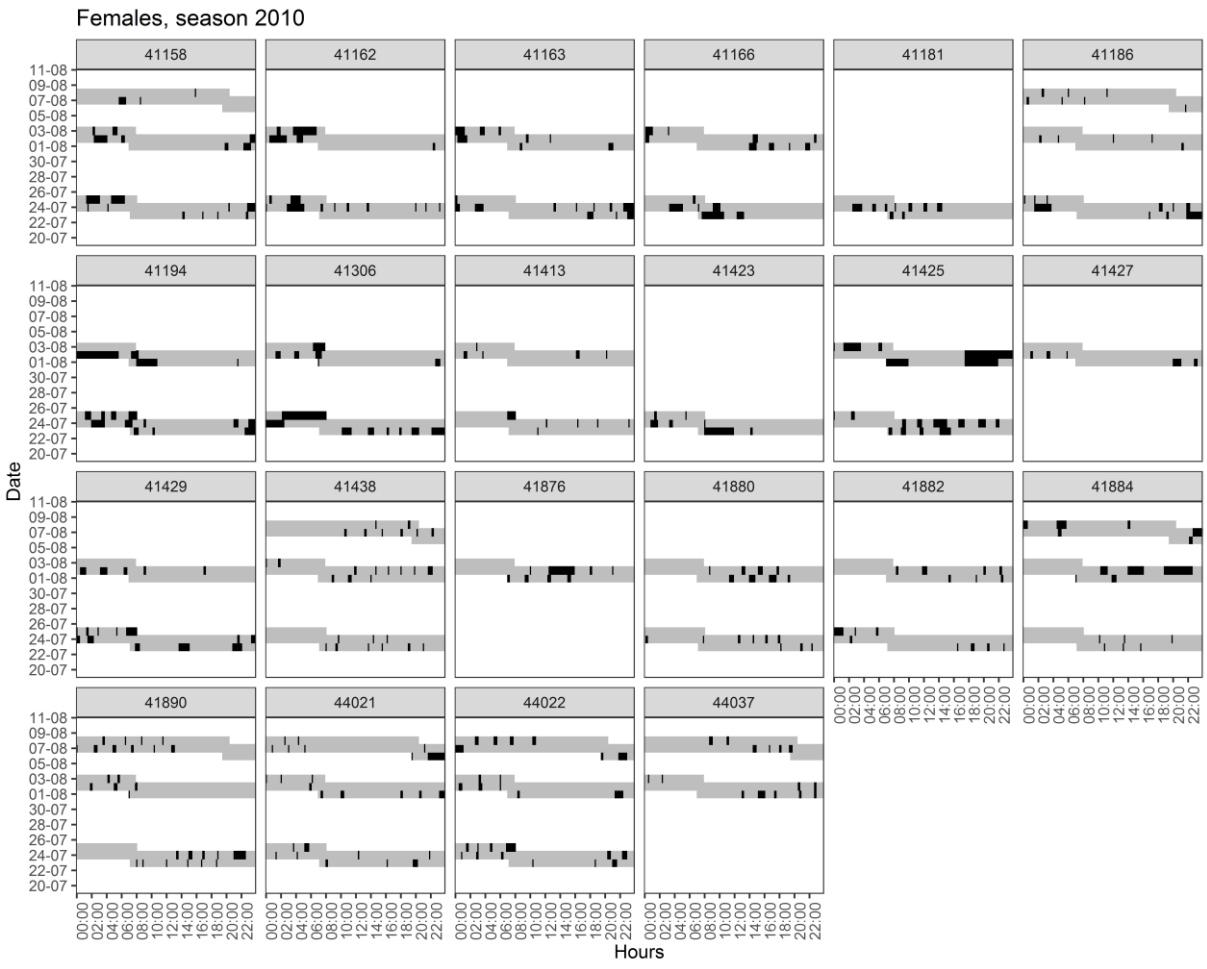


Supplementary Fig. S3. Colony attendance pattern of individually marked little auk females during (a) season 2009 and (b) season 2010, and males during (c) season 2009 and (d) season 2010), expressed as birds presence (black area) and absence (grey area) in the colony plot recorded during five 48-h observations, performed during the chick-rearing period (see Table 1 in the main text for details).

(a)



(b)


Females, season 2010
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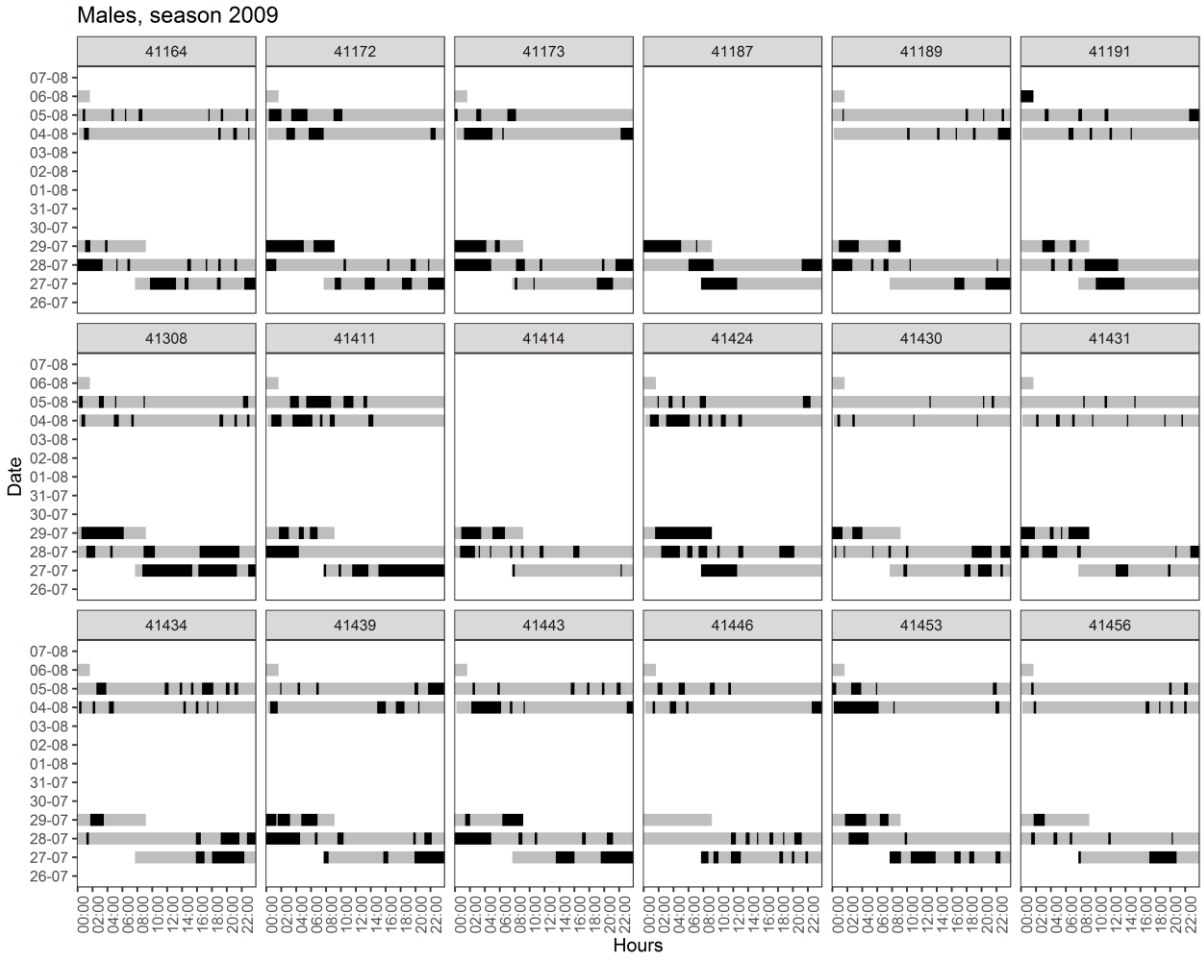
44021
44022
44037
Date
Hours

(c)


Males, season 2009
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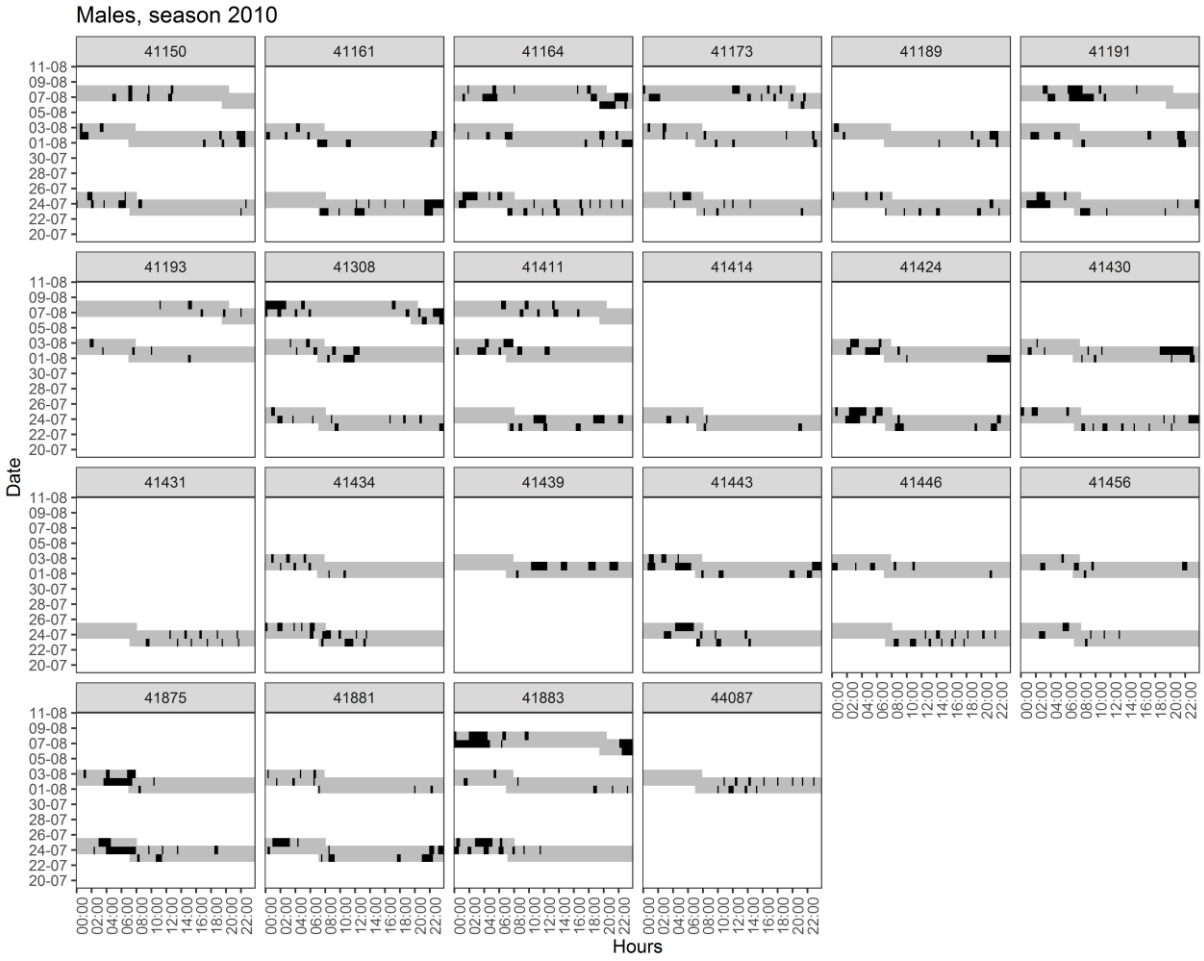
(d)


Males, season 2010
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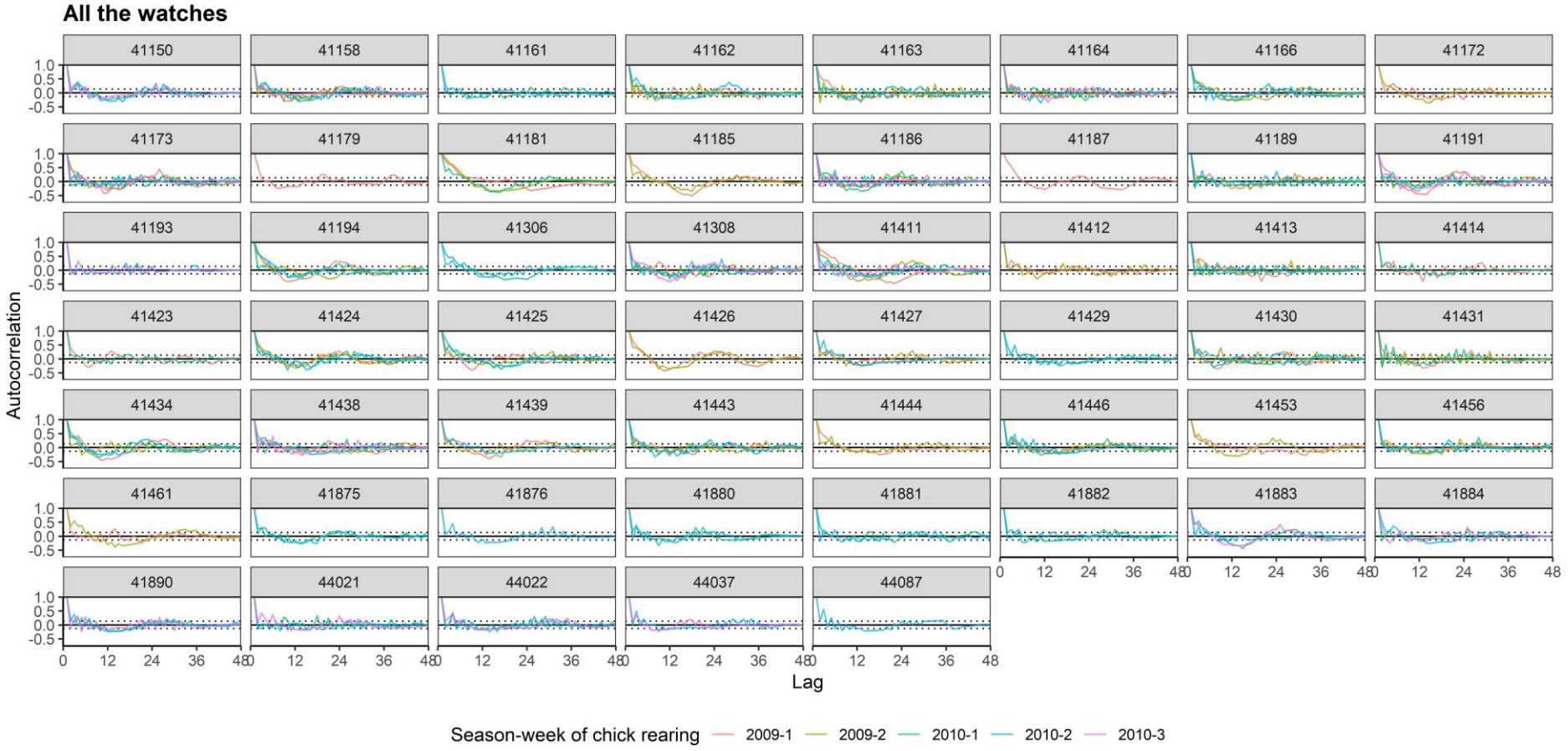
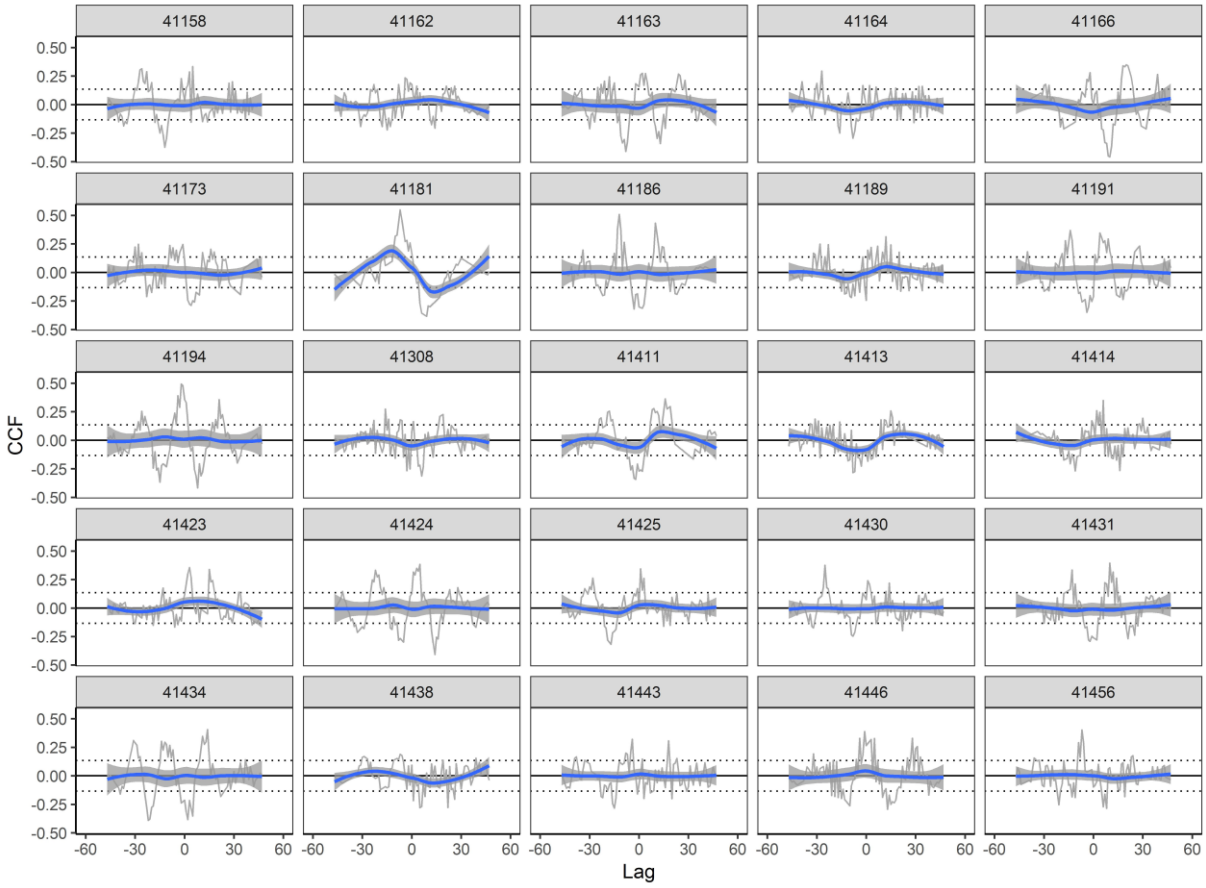
41443
41446
41456
41875
41881
41883
44087
Date
Hours

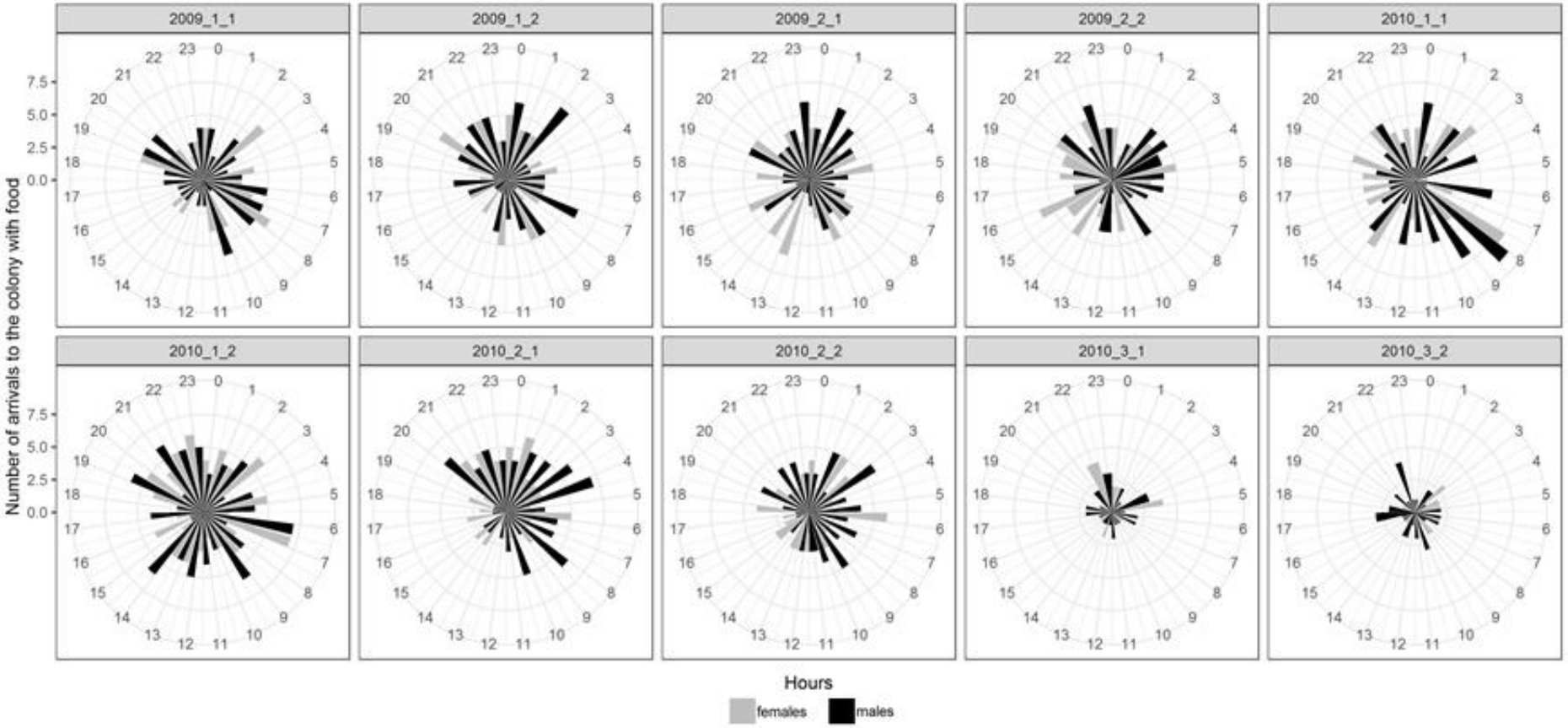
Supplementary Fig. S4. Periodicity in colony attendance of marked individuals (autocorrelation). Dotted lines denote 95% confidence intervals considered for each observation separately. Particular individuals coded by ring numbers that are provided in graph headings.



Supplementary Fig. S5. Cross-correlation correlograms (smoothed blue lines with grey area denoting standard error; grey lines denote raw values) for each individual (coded by ring numbers) observed during the second week of the chick-rearing period in two seasons. Dotted lines denoted threshold for significance of the cross-correlation coefficient.



Supplementary Fig. S6. Daily distribution of chick provisioning during the 48-h continuous observations, each split into 24-h periods (1 and 2), performed at three stages of the chick-rearing period (1, 2, 3) in two breeding seasons (2009 and 2010); males and females considered separately. Bars represent number of daily arrivals at the colony with food. Code of observations in graph headings: season, consecutive observation in the season, consecutive 24-h interval of given observation.



Supplementary Table S1. Basic circular statistics and test of uniformity for daily distribution of chick provisioning during the 48-h continuous observations (split into 24-h periods), performed at three stages of the chick-rearing period in two breeding seasons; males and females considered separately. Significant *p* value ($p < 0.05$) in boldface. Code of observations: season, consecutive observation in the season, consecutive 24-h interval of given observation, sex.

Observation	Circular mean	Circular standard deviation	Circular variance	Circular rho	Rayleigh statistics	*p* value
2009_1_1 f	4.4	2.13	0.9	0.1	0.09	0.57
2009_1_1 m	3.08	2.19	0.91	0.09	0.06	0.73
2009_1_2 f	1.67	2.1	0.89	0.11	0.05	0.83
2009_1_2 m	1.09	1.94	0.85	0.15	0.09	0.55
2009_2_1 f	10.79	3.06	0.99	0.01	0.12	0.32
2009_2_1 m	0.63	1.79	0.8	0.2	0.15	0.18
2009_2_2 f	19.1	1.88	0.83	0.17	0.07	0.70
2009_2_2 m	2.13	1.71	0.77	0.23	0.13	0.30
2010_1_1 f	22.16	2.34	0.94	0.06	0.20	**0.04**
2010_1_1 m	8.1	1.96	0.85	0.15	0.17	0.09
2010_1_2 f	0.95	2.09	0.89	0.11	0.14	0.18
2010_1_2 m	4.32	2.44	0.95	0.05	0.06	0.73
2010_2_1 f	0.24	1.71	0.77	0.23	0.11	0.45
2010_2_1 m	3	1.53	0.69	0.31	0.17	0.08
2010_2_2 f	1.32	2.09	0.89	0.11	0.06	0.81
2010_2_2 m	3.53	1.73	0.77	0.23	0.08	0.65
2010_3_1 f	1.84	1.97	0.86	0.14	0.08	0.85
2010_3_1 m	3.37	2.32	0.93	0.07	0.19	0.34
2010_3_2 f	5.91	1.71	0.77	0.23	0.19	0.42
2010_3_2 m	16.89	2.56	0.96	0.04	0.13	0.56