Table S1: Raw locomotor activity data (cm moved per hour) for all experiments. Note that in all figures and statistical analyses, activity for each animal was normalized (divided) by the maximum hourly activity. The third column (phase of light cycle) corresponds to conditions during the fall and lab studies.

Click here to Download Table S1

Table S2: Environmental data associated with field entrainment prior to behavioral assays. Average temperature indicates average of daily mean temperature during deployment period.

Deployment	Temperature (°C)		Lunar phase at sampling	Monitoring Condition(s)
	Range	Average		
7 Oct - 20 Oct	6.5 to 28.5	18.2	Recent New (Oct 19)	DD
7 Oct - 23 Oct	6.5 to 28.5	18.2	Crescent Oct 19-27	LD
13 Oct - 1 Nov	6.5 to 26.6	16.2	Gibbous (Oct 28-Nov 3)	LD, DD
20 Oct - 6 Nov	5.8 to 26.6	15.8	Recent Full (Nov 4)	LD, DD
20 Oct - 10 Nov	5.5 to 26.6	14.7	3rd Quarter (Nov 10)	LD, LL
30 Oct - 13 Nov	-1.8 to 22.5	11.0	Gibbous (Nov 11-17)	LD, LL
30 Oct - 17 Nov	-1.8 to 22.5	10.4	Nearly full (Nov 18)	LL
23 May - 7 Jun	12.4 to 36.2	21.9	3rd Quarter (Jun 6)	LD, LL
23 May - 11 June	12.4 to 36.2	22.1	3rd Quarter (Jun 6)	DD, LL
23 May - 15 June	12.4 to 36.2	21.8	Recent New (Jun 13)	DD, LL

Table S3: Period estimates from lab- and field-entrained anemones using the Long-Scargle periodogram (LSP), mFourfit (MFF) and Maximum Entropy Spectral Analysis (MESA) methods.

		LSP	MFF	MESA
Fall	LD	23.42	23.34	23.12
	DD	23.86	24.64	24.02
	LL	23.62	26.16	24.4
Spring	LD	24.22	23.22	23.64
	DD	25.86	25.66	24.72
	LL	27.34	26.8	26.28
Lab	LD	26.78	24.34	25.28
	DD	27.04	26.3	24.92

Table S4: Full results from rhythmicity analysis testing for circadian (columns 2-6) and circatidal (columns 7-10) periodicity. Annotation (columns 11-13) derived from Additional File 7 within Helm et al. 2013. Expression of each replicate shown as TMM-normalized counts (columns 14-61). File sorted according to significance of diurnal cycle.

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Table S5: GO enrichment analysis of 1640 diurnal cyclic genes in comparison to the 16,267 genes in the abundance-filtered transcriptome.

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Table S6: Intersection between 1640 diurnal cyclic genes in the present field study and 181 diurnal cyclic genes identified in a previous laboratory study. See text for further detail. "Brief annotation" contains brief names subjectively assigned from the blast results to facilitate ease of viewing.

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Table S7: Intersection between 1640 diurnal cyclic genes in the present field study and 434 UV-induced genes identified in a previous study. See text for further detail. "Brief annotation"" contained brief names subjectively assigned from the blast results to facilitate ease of viewing

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Figure S1: Entrainment of *Nematostella* under semi-natural conditions. Top left: mesh cage used in deployments, pen for scale. Top right: example of animal positioned with mouth at the level of the sediment-water interface and tentacles spread across the sediment surface. Bottom: mesh cages deployed within the study site in Great Sippewissett Marsh. See text for additional detail.

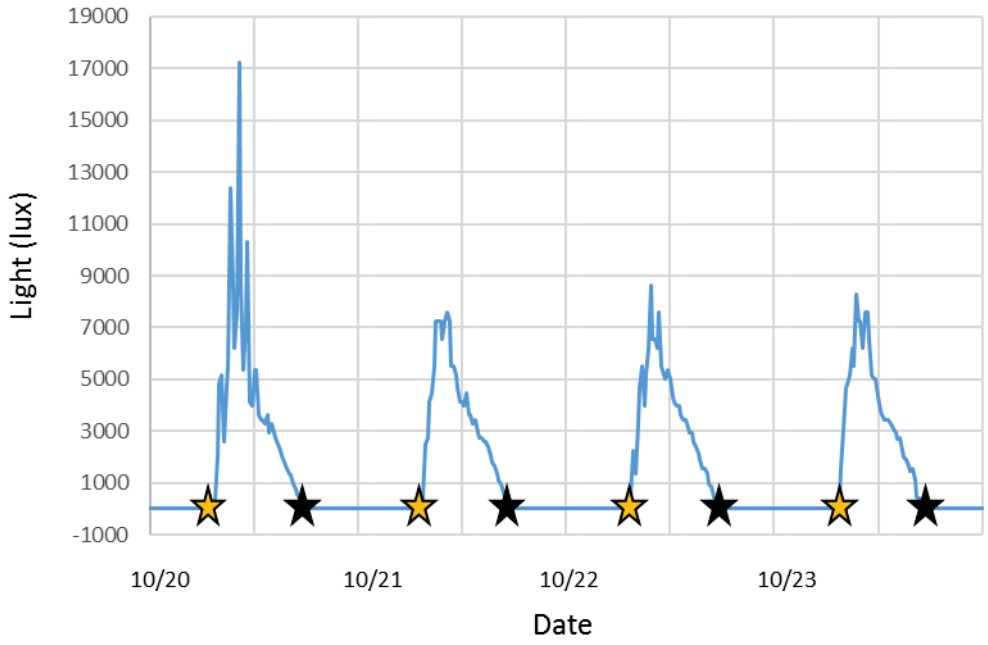

Figure S2: Examples of light levels measured by a HOBO logger during a fall 2017 field deployment. The absolute light levels should be interpreted with caution because the logger dangled in the water column with variable orientation relative to the sun. During this period, the timing of astronomical sunrise and sunset (yellow and black stars) matched within 15 minutes (logging interval) of light levels passing above or below zero lux. Daytime light levels in the water column are much higher than the 250 lux used during behavioral monitoring.

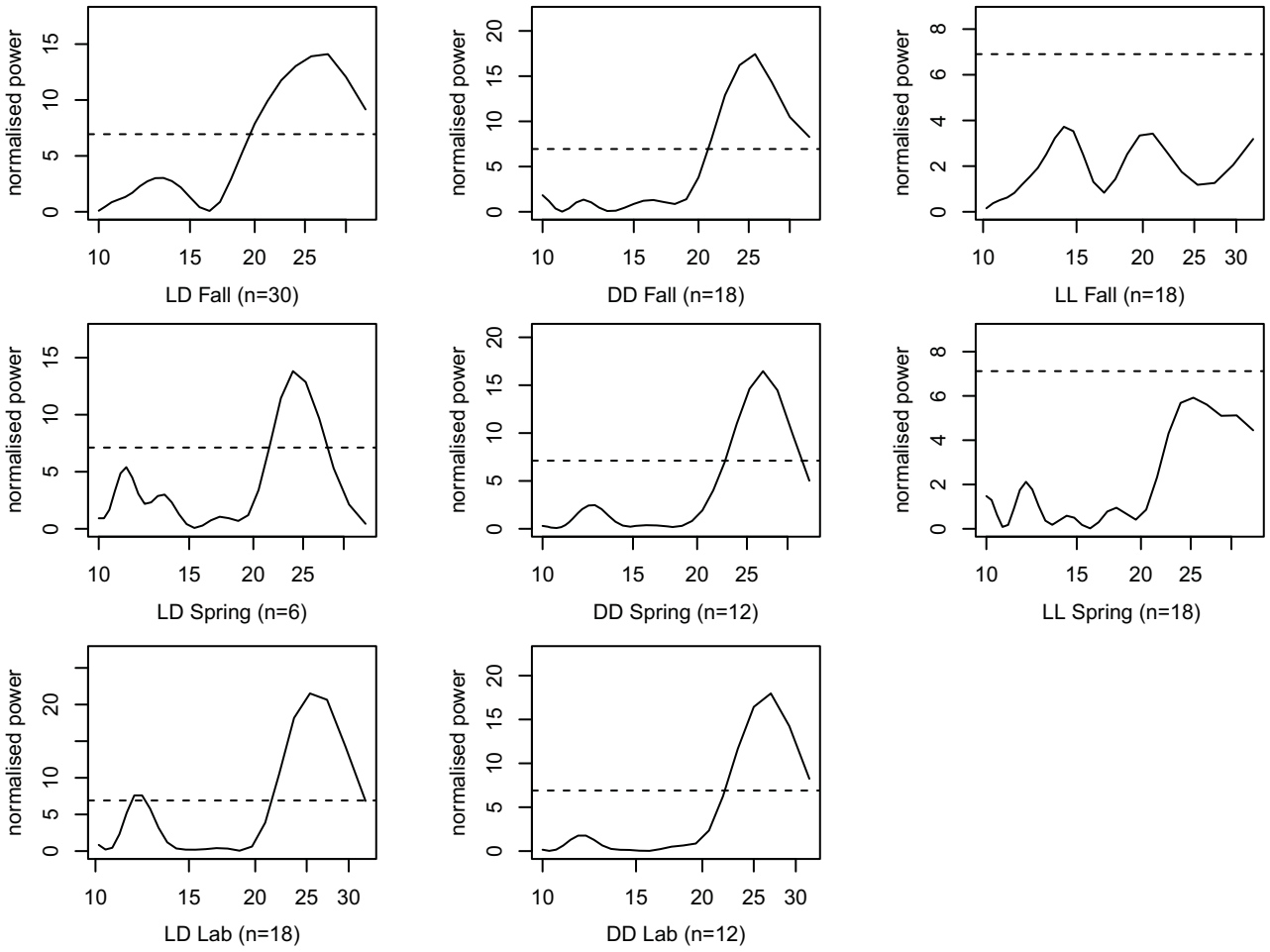

Figure S3: Lomb-Scargle periodogram analysis of full (this page) and truncated (next page) data series averaged across animals entrained in fall field (top), spring field (middle) or lab (bottom) conditions and monitored under LD (left), DD (center) or LL (right). Dashed line indicates significance at $p < 0.01$. In the second set of analyses, series were truncated to begin at sunrise on the first full day of observation.

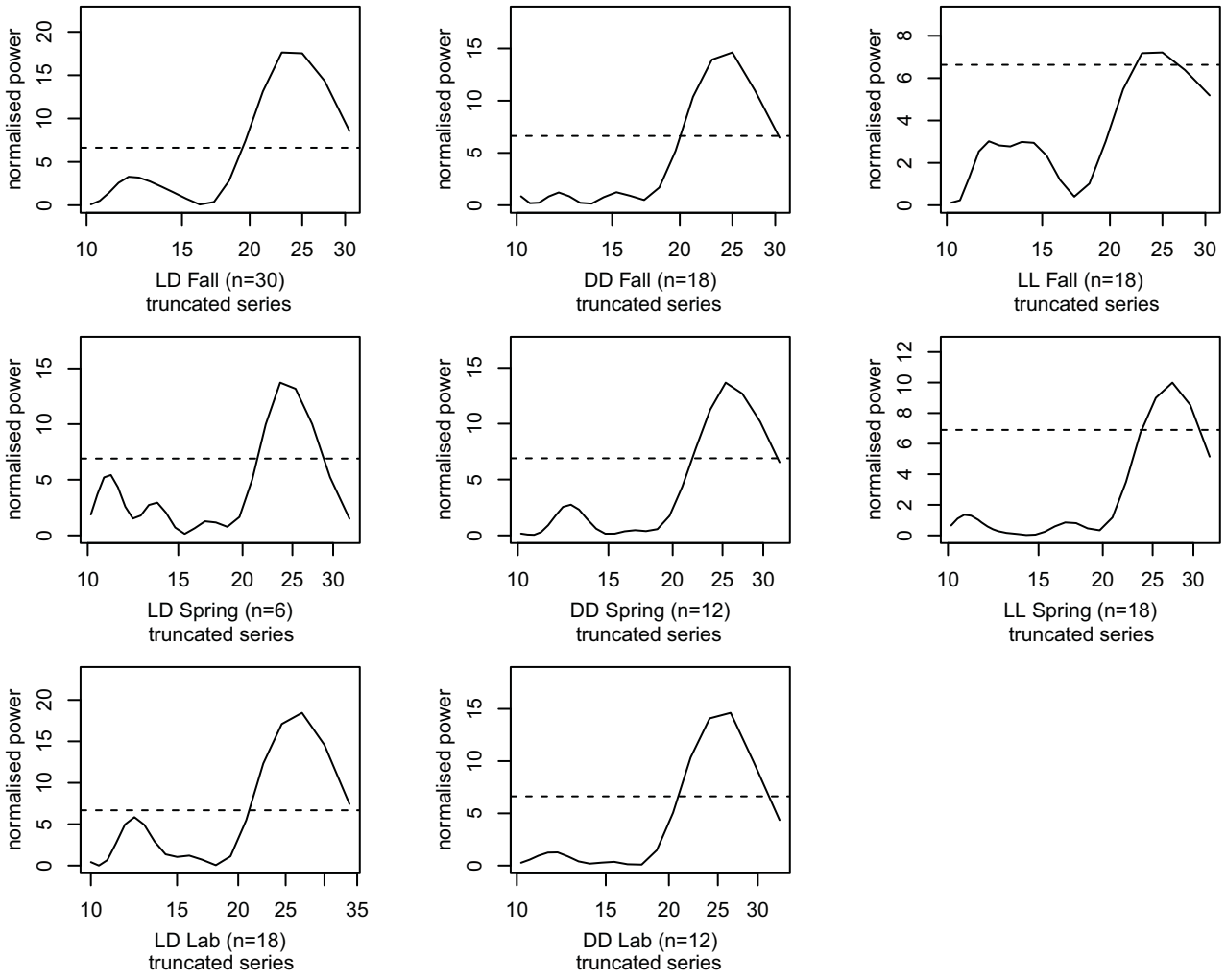

Figure S3: Lomb-Scargle periodogram analysis of full (previous page) and truncated (this page) data series averaged across animals entrained in fall field (top), spring field (middle) or lab (bottom) conditions and monitored under LD (left), DD (center) or LL (right). Dashed line indicates significance at $p < 0.01$. In the second set of analyses, series were truncated to begin at sunrise on the first full day of observation.

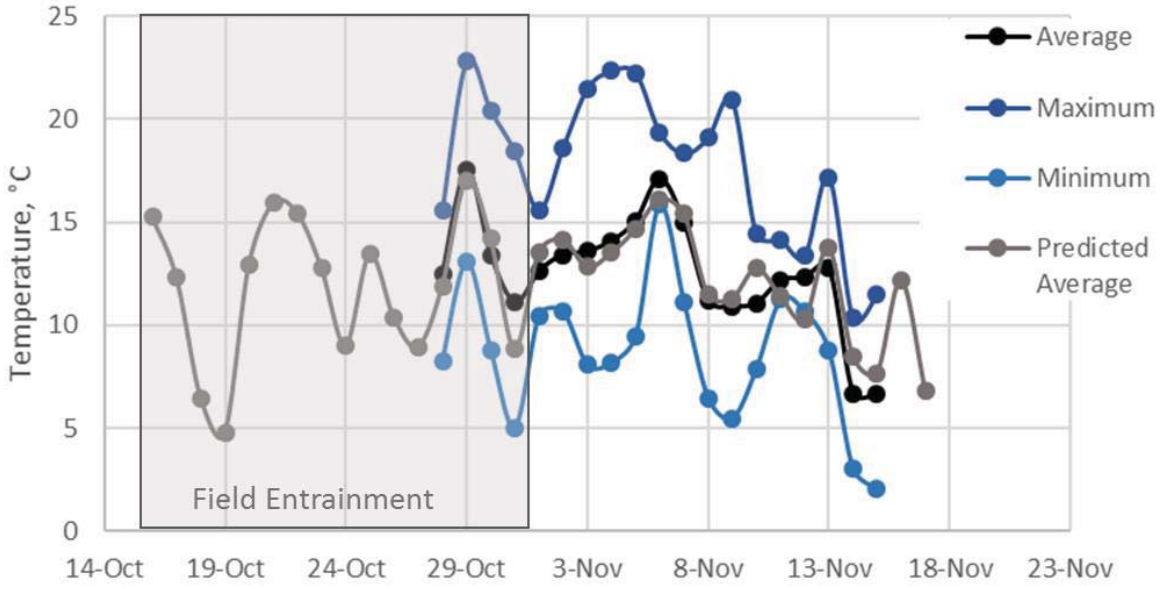

Figure S4: Measured and estimated water temperatures at the field site in Fall 2015. Dark and light blue lines indicate measured maximum and minimum daily water temperatures, respectively. Black and grey lines indicate measured and predicted average daily temperatures, respectively. Temperatures were measured using a HOBO logger and calculated from local air temperature, as described in the text. The shaded grey rectangle indicates the period of field entrainment prior to the gene expression study.

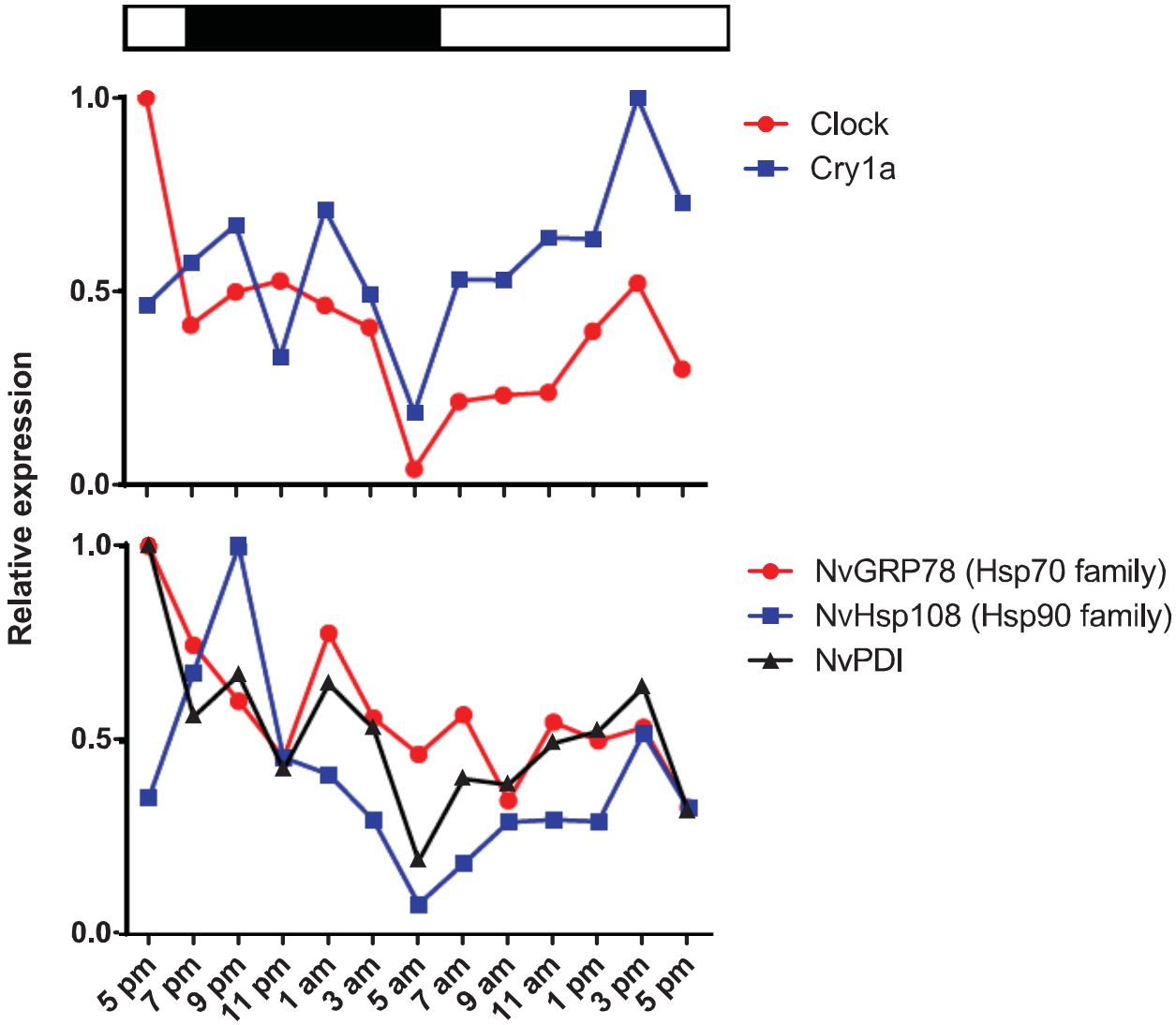

Figure S5: Selected expression profiles of genes with a diel cycle. Top panel shows core circadian regulators, and bottom panel shows three chaperones involved in the unfolded protein response. For each time point, the geometric mean was calculated for the replicate TMM-normalized counts. Expression is represented as a proportion of the maximum value for each gene. The bars at the top indicate light (white) and dark (black) periods.