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Supplementary material for:

The influence of weather and moon phase on small mammal activity

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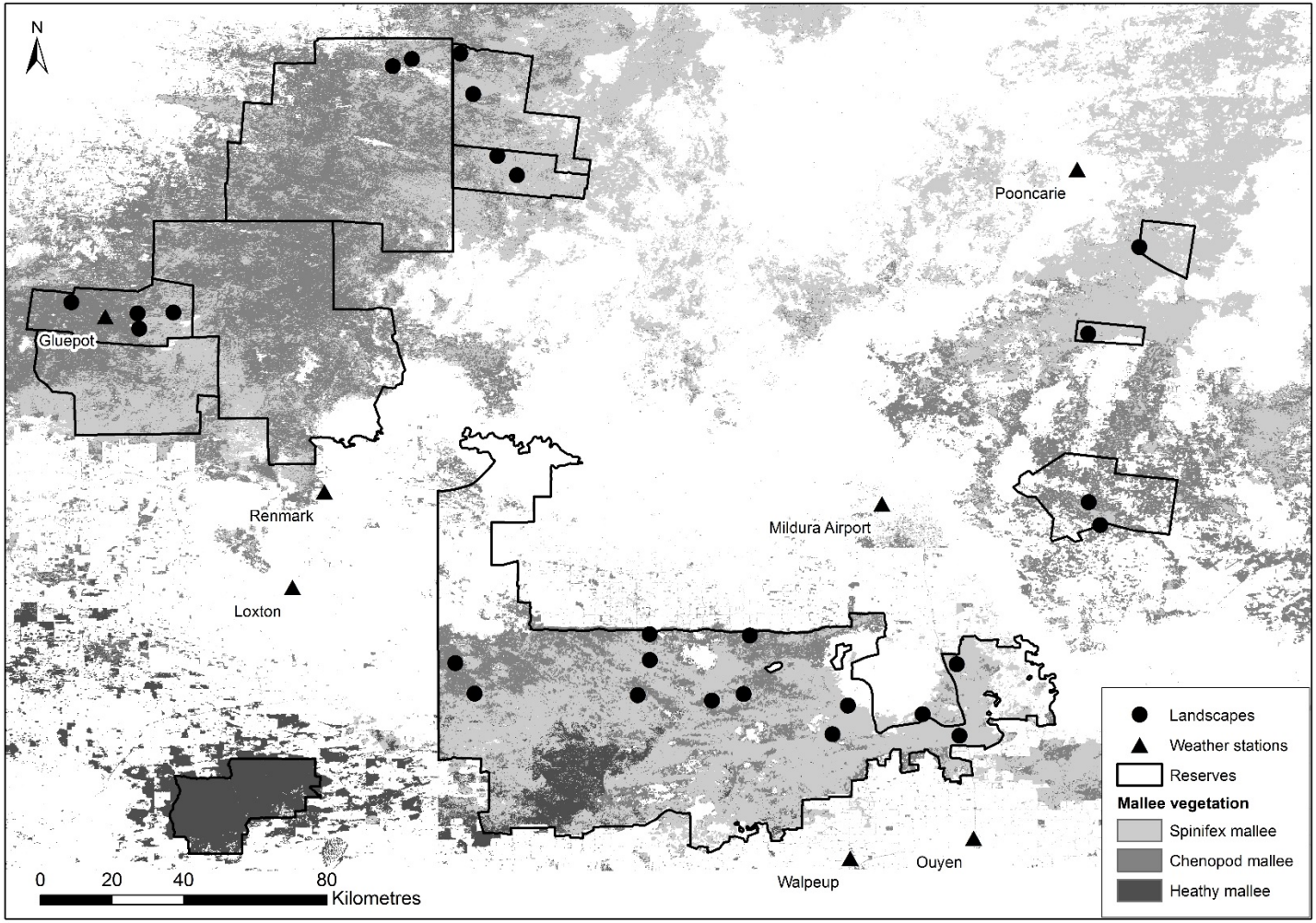

Figure S1: The extent of mallee vegetation in the Murray Mallee region of south-eastern Australia. Black circles represent the 27 landscapes used in this study, and black triangles represent the seven Bureau of Meteorology weather stations data was sourced from (Broken Hill station is located ~110 north of the map boundary).

Table S1: Survey dates and effort for each landscape used in this study.
*Survey effort per night is presented as either one consistent value for each night of the survey or presented consecutively for each night during the survey. Survey effort varies due to delays in opening some sites and the need to close individual buckets to prevent depredation by ants.

Landscape	Survey number for landscape	Year	Month(s)	Dates	Nights	Survey effort per night*
M01	1	2006	November	26th - 30th	5	100
	2	2007	March	15th - 18th	4	99
	3	2007	October	24th - 28th	5	100
	4	2008	January - February	30th – 4th	6	40, 100, 100, 100, 100, 60
	5	2011	November	22nd – 26th	5	50
	6	2012	March	5th – 9th	5	48, 47, 44, 48, 48
M02	1	2006	November	26th – 30th	5	100
	2	2007	March	14th – 19th	6	50, 100, 100, 100, 100, 50
	3	2007	October	24th – 28th	5	100
	4	2008	January - February	30th – 3rd	5	100
M03	1	2006	December	2nd – 6th	5	100, 98, 100, 100, 100
	2	2007	March	21st – 25th	5	100
	3	2007	October - November	30th – 3rd	5	100
	4	2008	February	7th – 11th	5	100
M04	1	2006	December	2nd – 6th	5	100
	2	2007	March	22nd – 26th	5	100
	3	2007	October - November	30th – 3rd	5	100
	4	2008	February	7th – 11th	5	100
M05	1	2006	October	24th – 28th	5	100
	2	2007	February	21st – 25th	5	100
	3	2008	March	7th – 11th	5	100
M06	1	2006	October	24th – 28th	5	100
	2	2007	February	21st – 25th	5	100
	3	2007	December	3rd – 7th	5	100
	4	2008	March	7th – 11th	5	100
M07	1	2006	October	24th – 28th	5	100

	2	2007	February	21st – 25th	5	100
	3	2007	December	3rd – 7th	5	100
	4	2008	March	7th – 11th	5	100
M08	1	2006	October	24th – 28th	5	100
	2	2007	February	21st – 25th	5	100
	3	2008	March	7th – 11th	5	100
M09	1	2006	October	24th – 28th	5	100
	2	2007	February	21st – 25th	5	100
	3	2007	December	3rd – 7th	5	100, 95, 100, 100, 100
	4	2008	March	7th – 11th	5	100
M10	1	2006	October	24th – 28th	5	100, 100, 99, 100, 100
	2	2007	February	21st – 25th	5	100
	3	2007	December	3rd – 7th	5	100
	4	2008	March	7th – 11th	5	100
M11	1	2006	November	26th – 30th	5	100
	2	2007	March	22nd – 26th	5	100
	3	2007	October - November	31st – 4th	5	100
	4	2008	January	23rd – 27th	5	100
	5	2011	November	8th – 12th	5	80, 78, 80, 80, 80
	6	2012	February	20th – 24th	5	57, 74, 71, 73, 77
M12	1	2006	November	26th – 30th	5	100
	2	2007	March	22nd – 26th	5	100
	3	2007	October - November	31st – 4th	5	100
	4	2008	January	23rd – 27th	5	99, 100, 100, 99, 100
	5	2011	November	8th – 12th	5	50, 49, 50, 50, 50
	6	2012	February	20th -24th	5	50, 49, 40, 49, 49
M13	1	2006	November	20th – 24th	5	100
	2	2007	March	21st – 25th	5	100
	3	2007	October	18th – 22nd	5	100
	4	2007	December	3rd – 7th	5	100
	5	2008	January - February	30th – 3rd	5	100
M14	1	2007	November	20th – 24th	5	100
	2	2007	March	21st – 25th	5	100

	3	2007	October	19th – 23nd	5	100
	4	2007	December	3rd – 7th	5	100
	5	2008	January - February	30th – 3rd	5	100
M15	1	2006	November	26th – 28th	3	100
	2	2007	March	14th – 18th	5	100
	3	2007	October	17th – 21st	5	100
	4	2007	November	26th – 30th	5	100
	5	2008	February	5th – 9th	5	100
M16	1	2006	November	26th – 30th	5	100
	2	2007	March	14th – 18th	5	100
	3	2007	November	26th – 30th	5	100
	4	2008	February	5th – 9th	5	100
M19	1	2006	October	17th – 21st	5	100
	2	2007	February	14th – 18th	5	100, 100, 99, 100, 100
	3	2007	November	26th -30th	5	100
	4	2008	February - March	29th – 4th	5	100
M20	1	2006	October	17th – 21st	5	100
	2	2007	February	14th – 18th	5	100
	3	2007	November	26th – 30th	5	100
	4	2008	February - March	29th – 4th	5	100
M21	1	2006	October	17th – 21st	5	100
	2	2007	February	14th – 19th	6	50, 100, 95, 94, 99, 48
	3	2007	November	26th – 30th	5	100, 100, 98, 94, 96
	4	2008	February - March	29th – 4th	5	100
M22	1	2006	October	17th – 21st	5	100
	2	2007	February	14th – 18th	5	100
	3	2007	November	26th – 30th	5	100
	4	2008	February - March	29th – 4th	5	99, 100, 100, 100, 98
M23	1	2006	October	17th – 21st	5	100
	2	2007	February	14th – 18th	5	100
	3	2007	November	26th – 30th	5	100
	4	2008	February – March	29th – 4th	5	100
	5	2011	October	28th – 31st	4	48, 45, 44, 44

M24	1	2006	October	17th – 21st	5	100
	2	2007	February	14th – 18th	5	100, 100, 96, 96, 100
	3	2007	November	26th – 30th	5	100
	4	2008	February – March	29th – 4th	5	100
	5	2011	October	28th – 31st	4	49, 48, 48, 48
M25	1	2006	November	26th – 30th	5	100
	2	2007	March	14th – 18th	5	100
	3	2007	October - November	30th – 3rd	5	100
	4	2008	January	23rd – 27th	5	100
M26	1	2006	November	26th – 30th	5	100
	2	2007	March	14th – 18th	5	100
	3	2007	October- November	30th – 3rd	5	100
	4	2008	January	23rd – 27th	5	100, 99, 99, 99, 99
M27	1	2006	November	19th – 23rd	5	100
	2	2007	March	21st – 25th	5	100
	3	2007	October	24th – 28th	5	100
	4	2008	January - February	30th – 3rd	5	100
M28	1	2006	November	19th – 23rd	5	100
	2	2007	March	21st – 25th	5	100
	3	2007	October	24th – 28th	5	100
	4	2008	January - February	30th – 3rd	5	100
MH01	1	2011	November	22nd – 26th	5	70, 69, 70, 70, 70
	2	2012	March	5th – 9th	5	70, 69, 66, 70, 70

Table S2: Weather stations where data was sourced for the five weather variables for each of the 27 study landscapes.

Landscape	Variable source (weather station)				
	Min. temperature	**Precipitation**	**Relative humidity**	**Wind speed**	**Cloud cover**
M01	Mildura Airport	Mildura Airport	Mildura Airport	Mildura Airport	Mildura Airport
M02	Ouyen	Ouyen	Walpeup	Walpeup	Mildura Airport
M03	Walpeup	Walpeup	Walpeup	Walpeup	Mildura Airport
M04	Walpeup	Walpeup	Walpeup	Walpeup	Mildura Airport
M05	Mildura Airport	Mildura Airport	Mildura Airport	Mildura Airport	Mildura Airport
M06	Walpeup	Walpeup	Walpeup	Walpeup	Mildura Airport
M07	Walpeup	Walpeup	Walpeup	Walpeup	Mildura Airport
M08	Mildura Airport	Mildura Airport	Mildura Airport	Mildura Airport	Mildura Airport
M09	Mildura Airport	Mildura Airport	Mildura Airport	Mildura Airport	Mildura Airport
M10	Walpeup	Walpeup	Walpeup	Walpeup	Mildura Airport
M11	Loxton	Loxton	Loxton	Loxton	Mildura Airport
M12	Loxton	Loxton	Loxton	Loxton	Mildura Airport
M13	Gluepot	Gluepot	Renmark	Renmark	Mildura Airport
M14	Gluepot	Gluepot	Renmark	Renmark	Mildura Airport
M15	Gluepot	Gluepot	Renmark	Renmark	Mildura Airport
M16	Gluepot	Gluepot	Renmark	Renmark	Mildura Airport
M19	Gluepot	Gluepot	Renmark	Renmark	Mildura Airport
M20	Gluepot	Gluepot	Broken Hill	Broken Hill	Mildura Airport
M21	Gluepot	Gluepot	Broken Hill	Broken Hill	Mildura Airport
M22	Gluepot	Gluepot	Renmark	Renmark	Mildura Airport
M23	Gluepot	Gluepot	Renmark	Renmark	Mildura Airport
M24	Gluepot	Gluepot	Renmark	Renmark	Mildura Airport
M25	Mildura Airport	Mildura Airport	Mildura Airport	Mildura Airport	Mildura Airport
M26	Mildura Airport	Mildura Airport	Mildura Airport	Mildura Airport	Mildura Airport
M27	Pooncarie	Pooncarie	Mildura Airport	Mildura Airport	Mildura Airport
M28	Pooncarie	Pooncarie	Mildura Airport	Mildura Airport	Mildura Airport
MH01	Ouyen	Ouyen	Walpeup	Walpeup	Mildura Airport

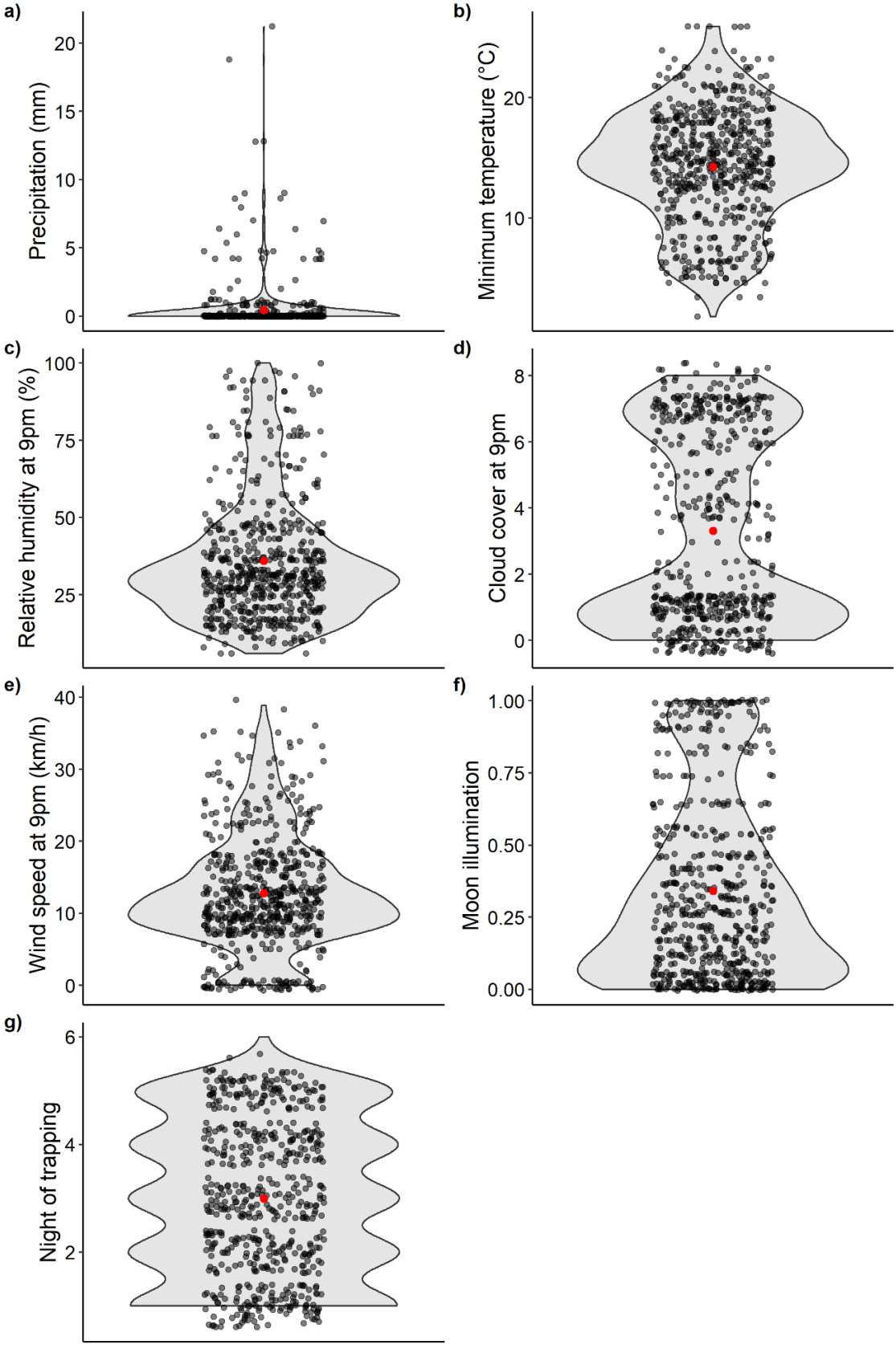

Figure S2: Violin plots of the seven explanatory variables used in our analysis. Variables are; a) Precipitation in the 24hrs prior to 12 am on the night of trapping (mm); b) Minimum temperature on the night of trapping (°C); c) Relative humidity at 9 pm (%); d) Cloud cover at 9 pm; e) Wind speed at 9 pm (km/h); f) Moon illumination; g) Night of trapping

Table S3: Summary statistics of the seven explanatory variables used in the analysis

Variable	Range	Median	Mean
Precipitation 24 hours prior to 9 pm (mm)	0.00 - 21.20	0.00	0.45
Minimum temperature (°C)	1.80 - 25.90	12.10	11.85
Relative humidity at 9pm (%)	6.00 - 100.00	31.10	36.03
Cloud cover at 9pm	0.00 - 8.00	2.00	3.31
Wind speed at 9pm (km/h)	0.00 - 38.90	11.20	12.78
Moon illumination (%)	0.00 - 100.00	26.00	34.00
Night of trapping	1.00 - 6.00	N/A	N/A

Table S4: Species included in each individual and family model used in our analysis.

Model type	Species	Family
Individual	*Cercartetus concinnus* (western pygmy possum)	Burraymid
Individual	*Mus musculus* (house mouse)	Rodent
Individual	*Pseudomys bolami* (Bolam's mouse)	Rodent
Individual	*Ningaui yvonneae* (mallee ningaui)	Dasyurid
Individual	*Sminthopsis murina* (common dunnart)	Dasyurid
Family	*Cercartetus concinnus* (western pygmy possum), *Cercartetus lepidus* (little pygmy possum)	Burraymid
Family	*Mus musculus* (house mouse), *Notomys mitchellii* (Mitchell's hopping mouse), *Pseudomys bolami* (Bolam's mouse)	Rodent
Family	*Ningaui yvonneae* (mallee ningaui), *Sminthopsis murina* (common dunnart)	Dasyurid

Table S5: Results of GLMMs testing the influence of weather and moon phase on capture rates of small mammals. Standardised model coefficients (± SE) are reported (following Gelman and Hill 2007) for the conditional (negative-binomial) and zero-inflated models (where fitted). Results in bold indicate those where the 95% confidence intervals do not overlap zero.

Response variable	**Precip.**	**Min. temp.**	**Rel. humid.**	**Cloud cover**	**Wind speed**	**Night**	**Moon illum.**
			Conditional model coefficient (± SE) of predictor variable				
C. concinnus	0.13 ± 0.31	0.36 ± 0.27	**1.28 ± 0.21**	**-1 ± 0.23**	**1.99 ± 0.3**	**-1.17 ± 0.23**	**1.27 ± 0.45**
M. musculus	-0.16 ± 0.1	-0.39 ± 0.25	**0.87 ± 0.27**	0.11 ± 0.21	**1.17 ± 0.35**	**-0.62 ± 0.3**	0.34 ± 0.39
N. yvonneae	-0.23 ± 0.15	**0.49 ± 0.09**	0.12 ± 0.1	-0.12 ±0.095	**0.44 ± 0.08**	**-0.31 ± 0.08**	**-0.52 ± 0.14**
P. bolami	0.26 ± 0.26	**-1.13 ± 0.48**	-0.44 ± 0.5	0.93 ± 0.57	0.25 ± 0.34	0.3 ± 0.39	**-2.13 ± 0.59**
S. murina	0.13 ± 0.18	0.22 ± 0.14	**-0.61 ± 0.16**	**0.47 ± 0.13**	**0.3 ± 0.13**	**-0.31 ± 0.12**	-0.19 ± 0.17
Burramyids	0.07 ± 0.27	0.16 ± 0.26	**1.11 ± 0.2**	**-0.59 ± 0.22**	**1.22 ± 0.29**	**-0.75 ± 0.23**	**1 ± 0.41**
Dasyurids	-0.12 ± 0.12	**0.38 ± 0.08**	-0.12 ± 0.09	0.09 ± 0.08	**0.41 ± 0.07**	**-0.3 ± 0.07**	**-0.35 ± 0.11**
Rodents	-0.1 ± 0.1	**-0.47 ± 0.21**	**0.71 ± 0.2**	0.05 ± 0.2	**0.56 ± 0.23**	**-0.63 ± 0.19**	0.41 ± 0.3
			Zero-inflated model coefficient (± SE) of predictor variable				
C. concinnus	0.47 ± 0.55	-1.25 ± 0.67	0.6 ± 0.58	-0.82 ± 0.6	**1.58 ± 0.69**	**-2.31 ± 0.67**	**1.52 ± 0.56**
M. musculus	-0.15 ± 0.28	0.13 ± 0.47	0.3 ± 0.49	0.34 ± 0.4	**1.31 ± 0.63**	-0.68 ± 0.5	0.09 ± 0.42
Burramyids	-0.09 ± 0.55	-0.37 ± 0.57	0.52 ± 0.47	-0.4 ± 0.49	0.45 ± 0.49	**-1.19 ± 0.53**	**1.18 ± 0.44**
Rodents	-0.15 ± 0.28	0.02 ± 0.4	0.29 ± 0.38	0.27 ± 0.4	0.43 ± 0.4	**-0.76 ± 0.37**	0.11 ± 0.4

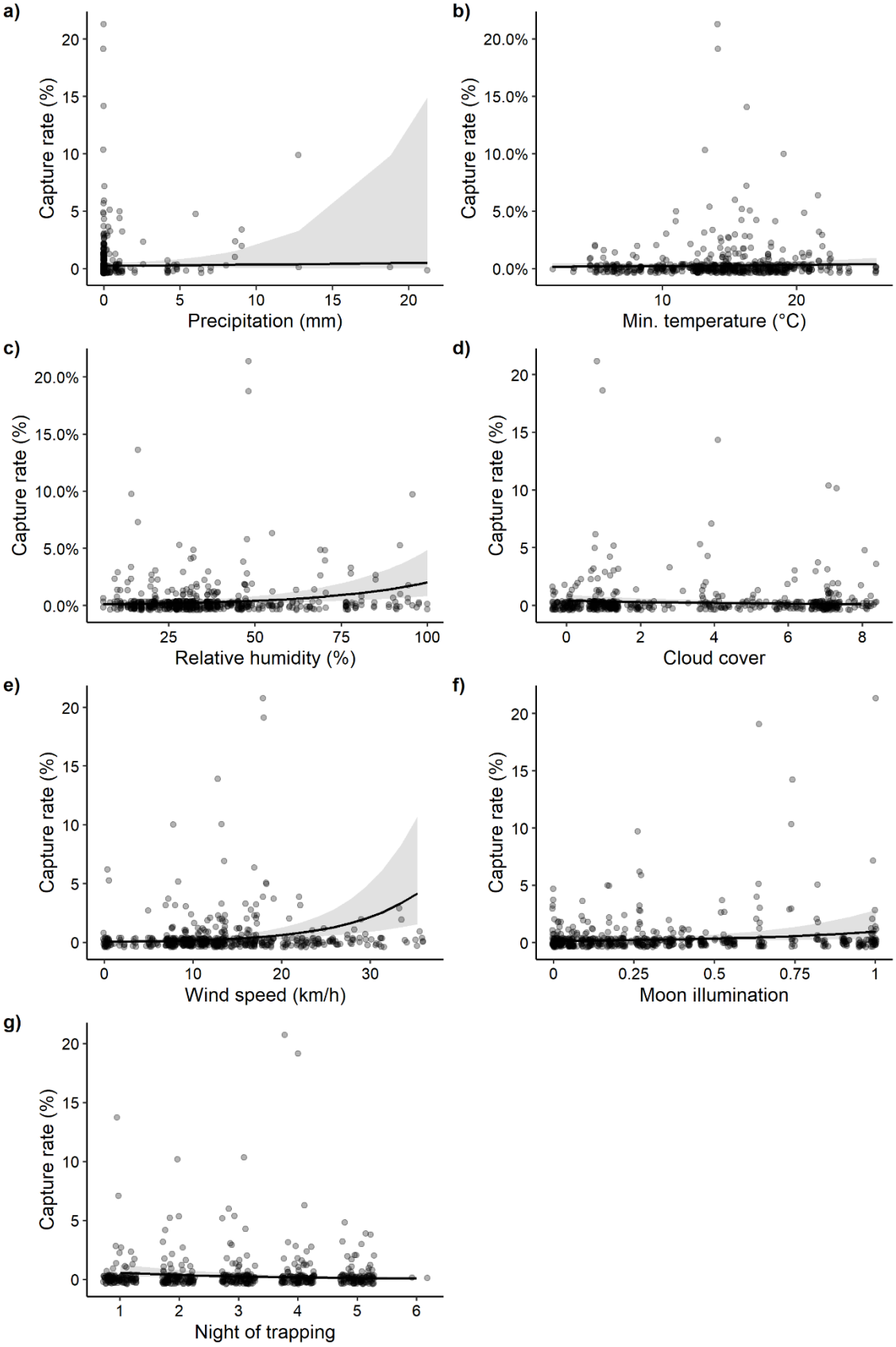

Figure S3: Response of capture rates of *Cercartetus concinnus* to; a) precipitation in the 24 hours prior to 00:00; b) minimum overnight temperature; c) relative humidity at 21:00; d) cloud cover at 21:00; e) wind speed at 21:00; f) moon illumination between 1700 and 2100; g) night of trapping within a single consecutive period

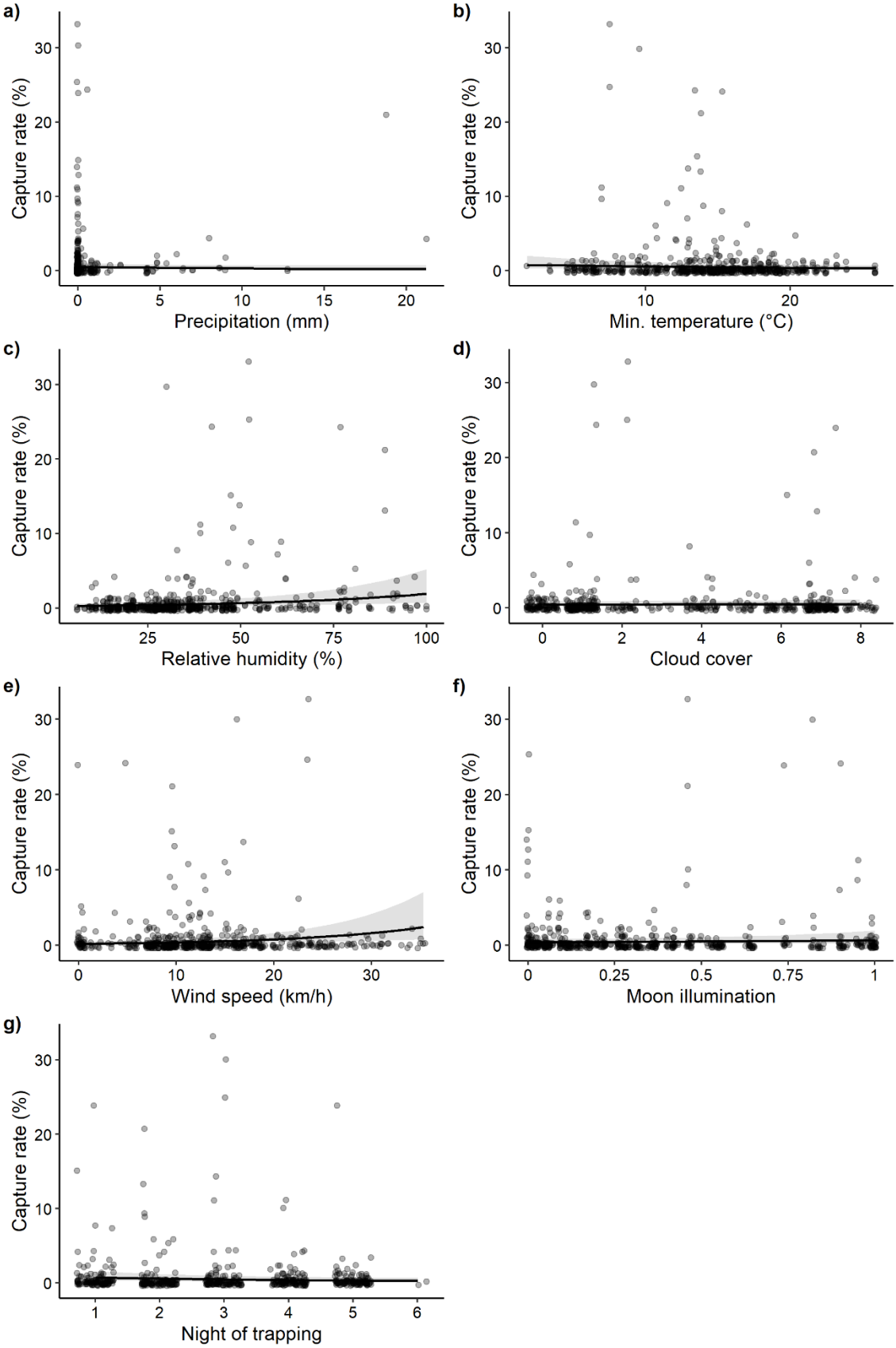

Figure S4: Response of capture rates of *Mus musculus* to; a) precipitation in the 24 hours prior to 00:00; b) minimum overnight temperature; c) relative humidity at 21:00; d) cloud cover at 21:00; e) wind speed at 21:00; f) moon illumination between 1700 and 2100; g) night of trapping within a single consecutive period

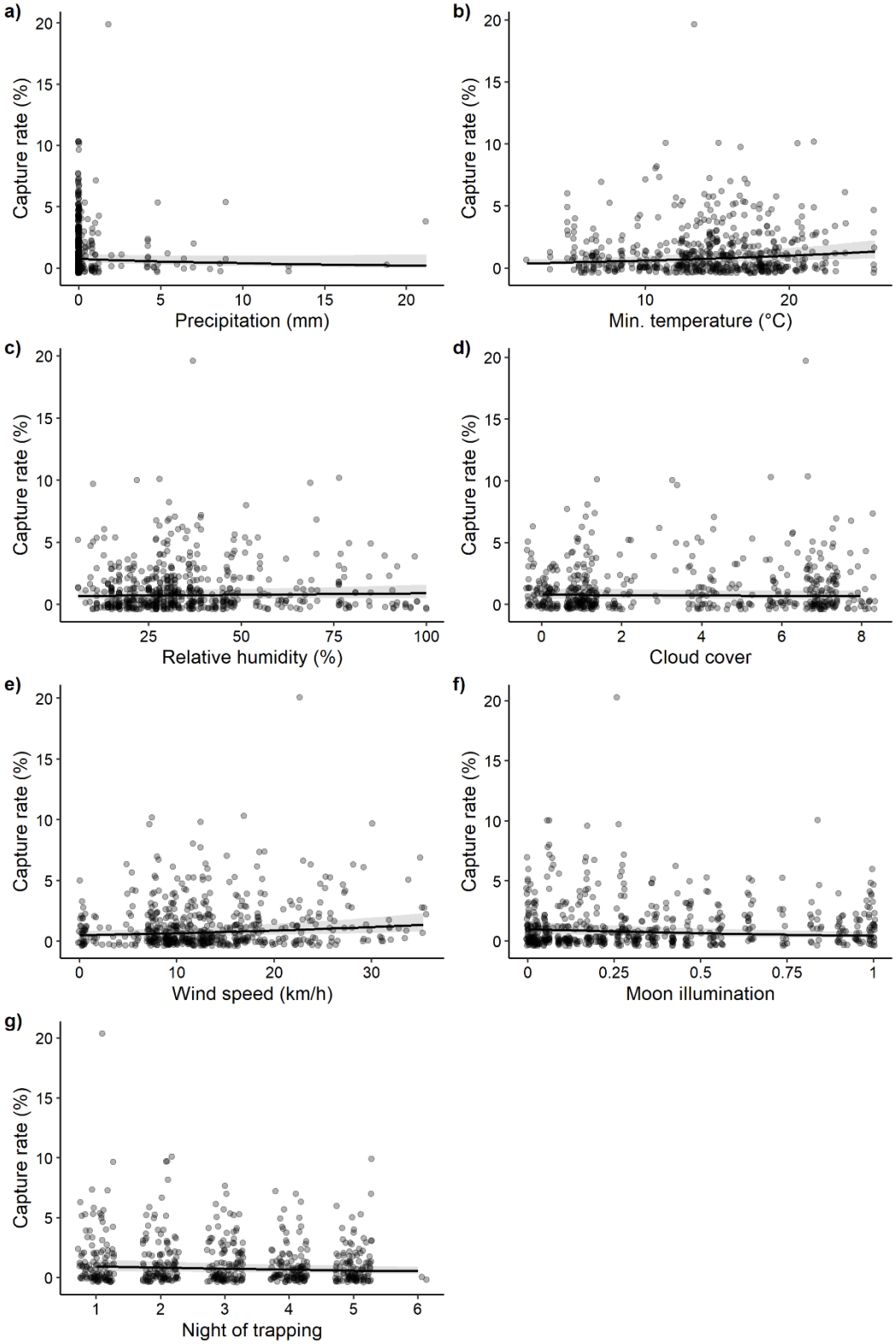

Figure S5: Response of capture rates of *Ningaui yvonneae* to; a) precipitation in the 24 hours prior to 00:00; b) minimum overnight temperature; c) relative humidity at 21:00; d) cloud cover at 21:00; e) wind speed at 21:00; f) moon illumination between 1700 and 2100; g) night of trapping within a single consecutive period

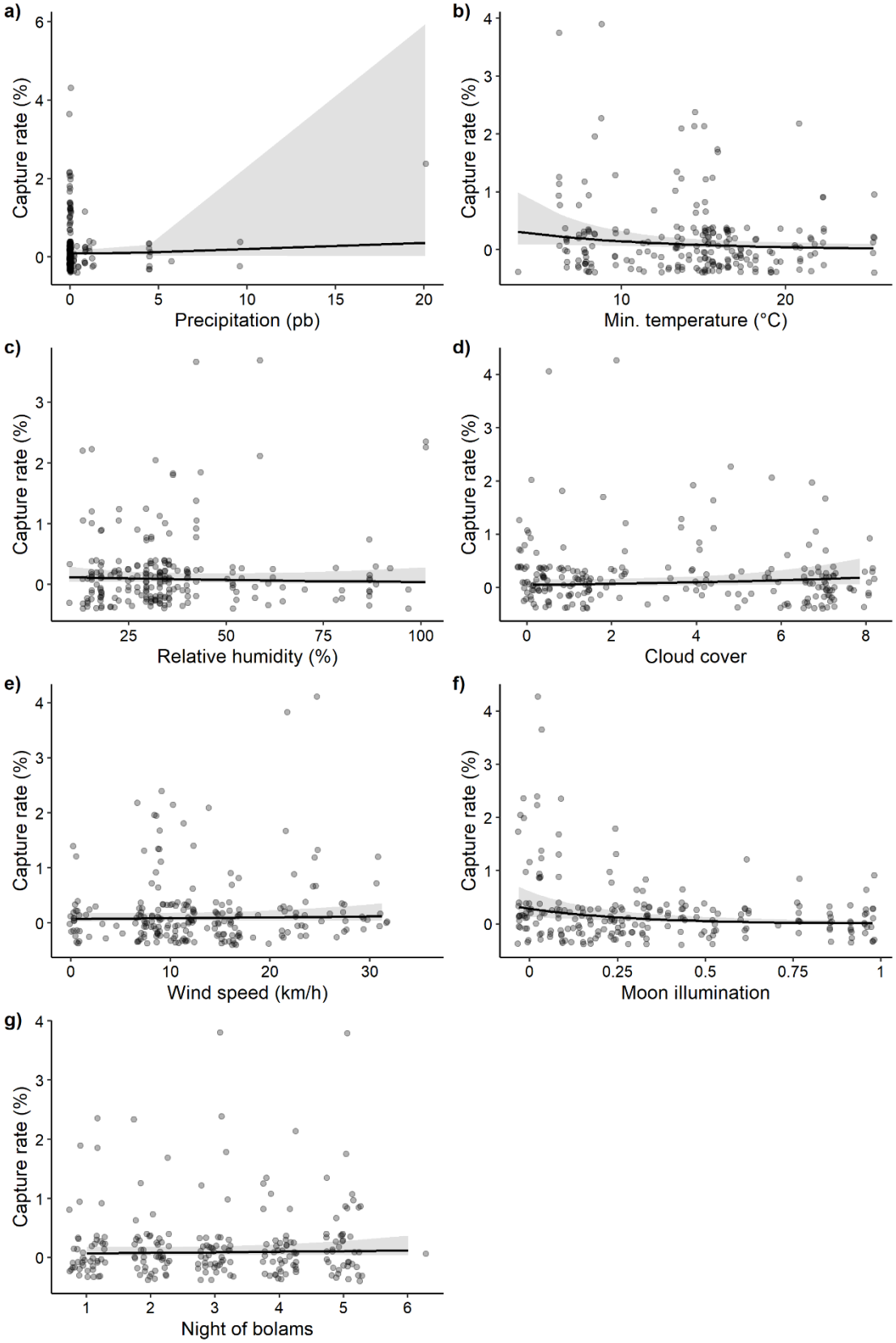

Figure S6: Response of capture rates of *Pseudomys bolami* to; a) precipitation in the 24 hours prior to 00:00; b) minimum overnight temperature; c) relative humidity at 21:00; d) cloud cover at 21:00; e) wind speed at 21:00; f) moon illumination between 1700 and 2100; g) night of trapping within a single consecutive period

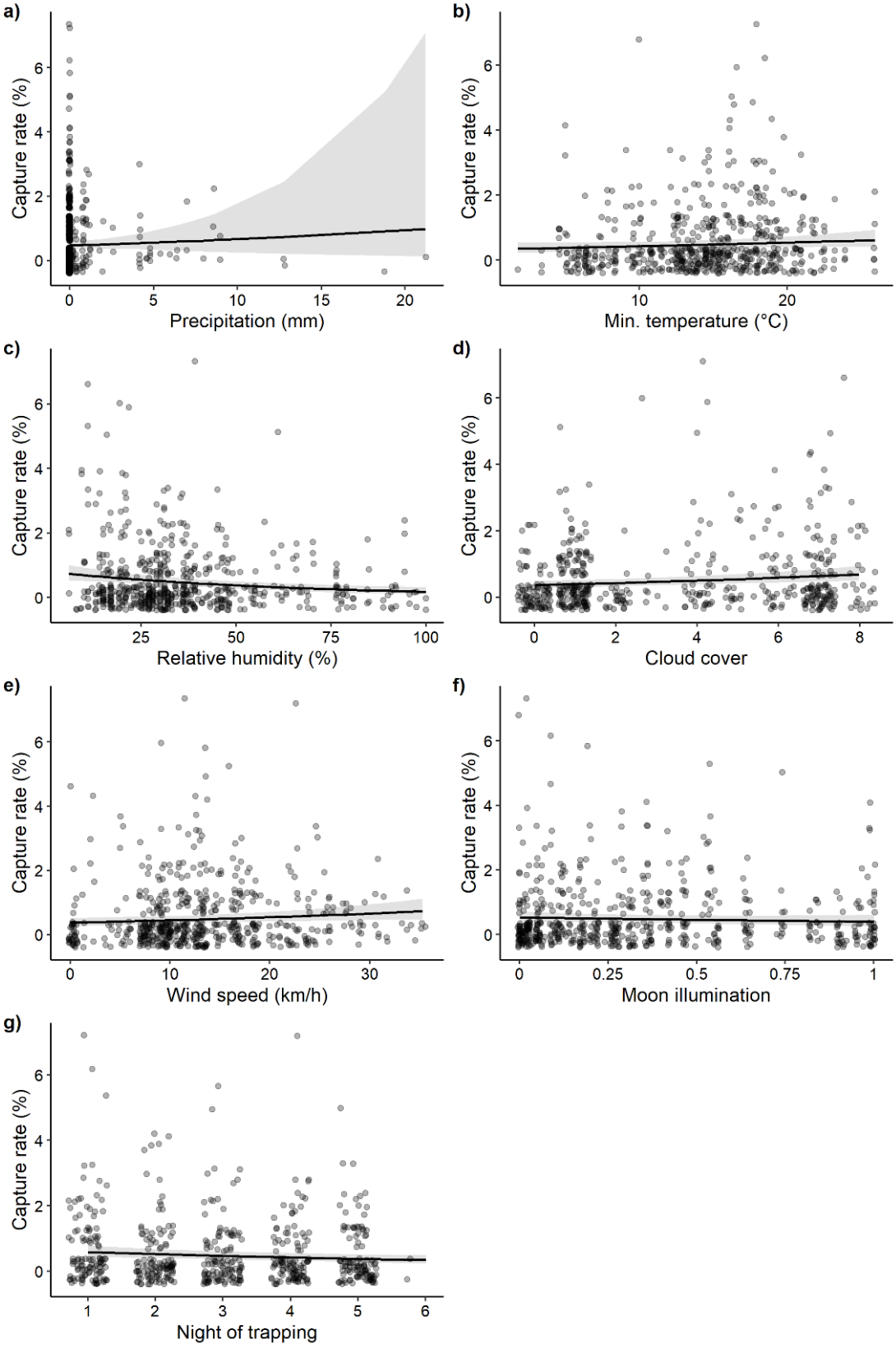

Figure S7: Response of capture rates of *Sminthopsis murina* to; a) precipitation in the 24 hours prior to 00:00; b) minimum overnight temperature; c) relative humidity at 21:00; d) cloud cover at 21:00; e) wind speed at 21:00; f) moon illumination between 1700 and 2100; g) night of trapping within a single consecutive period

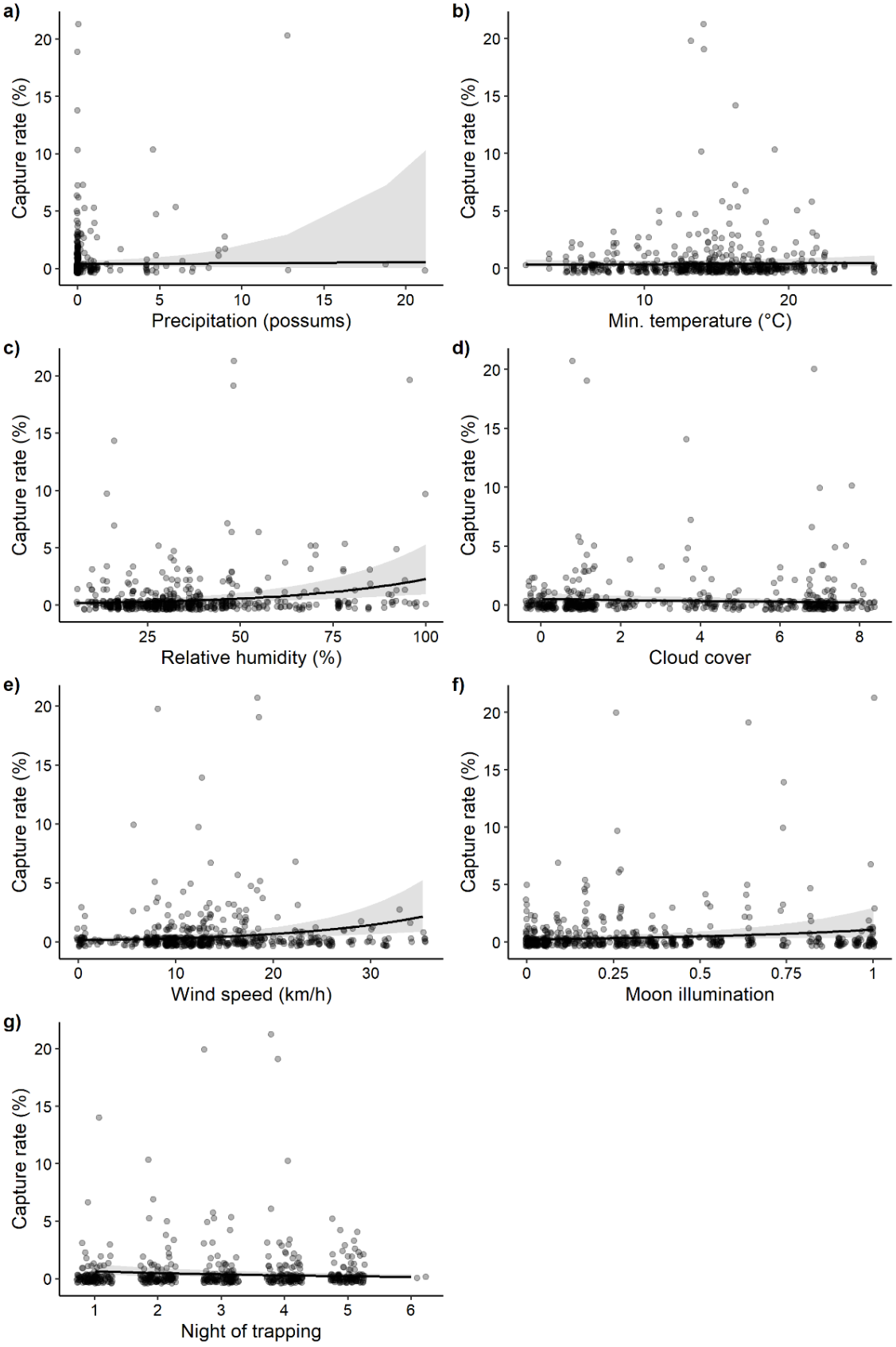

Figure S8: Response of capture rates of the burramyid family to; a) precipitation in the 24 hours prior to 00:00; b) minimum overnight temperature; c) relative humidity at 21:00; d) cloud cover at 21:00; e) wind speed at 21:00; f) moon illumination between 1700 and 2100; g) night of trapping within a single consecutive period

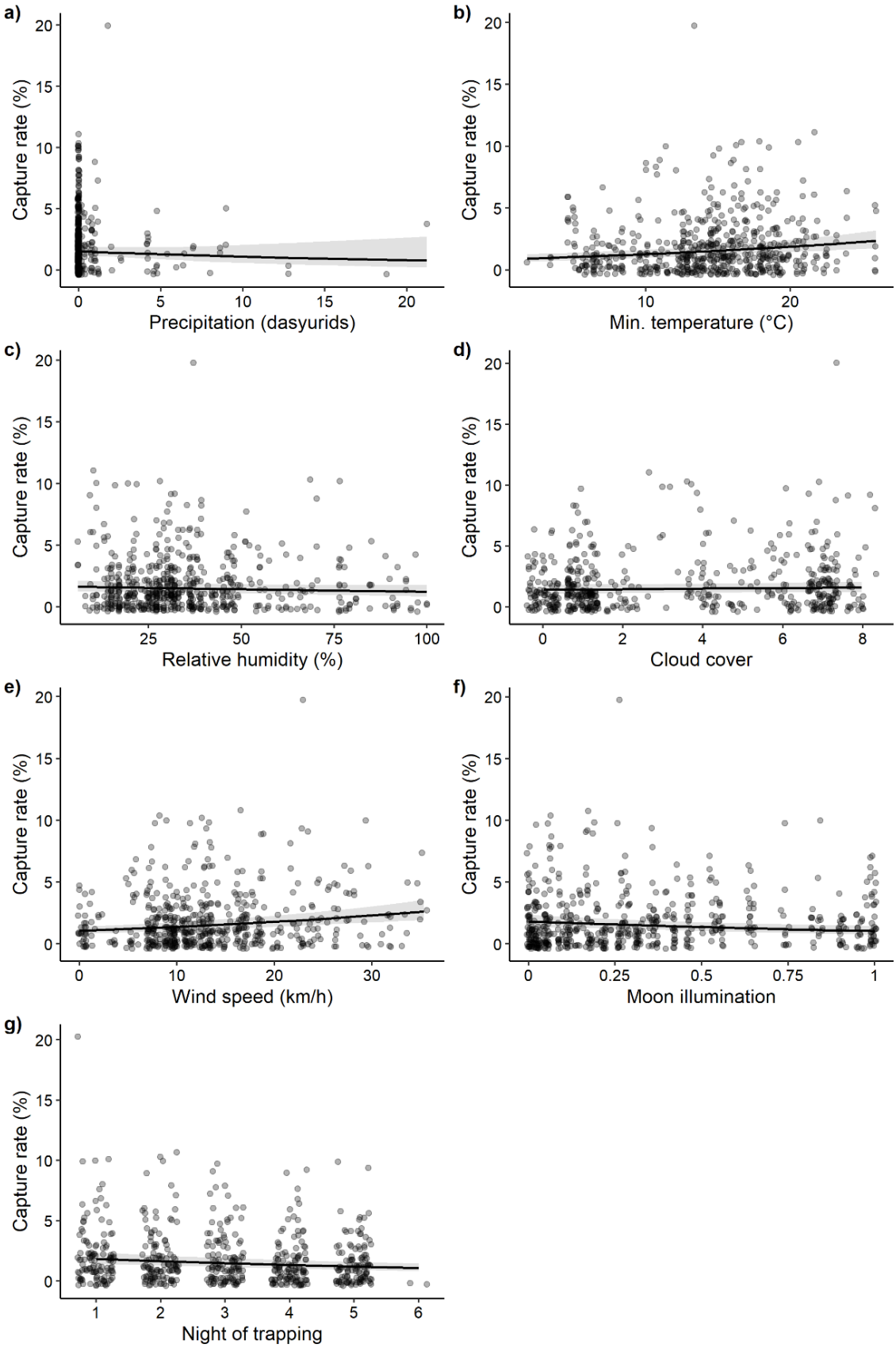

Figure S9: Response of capture rates of the dasyurid family to; a) precipitation in the 24 hours prior to 00:00; b) minimum overnight temperature; c) relative humidity at 21:00; d) cloud cover at 21:00; e) wind speed at 21:00; f) moon illumination between 1700 and 2100; g) night of trapping within a single consecutive period

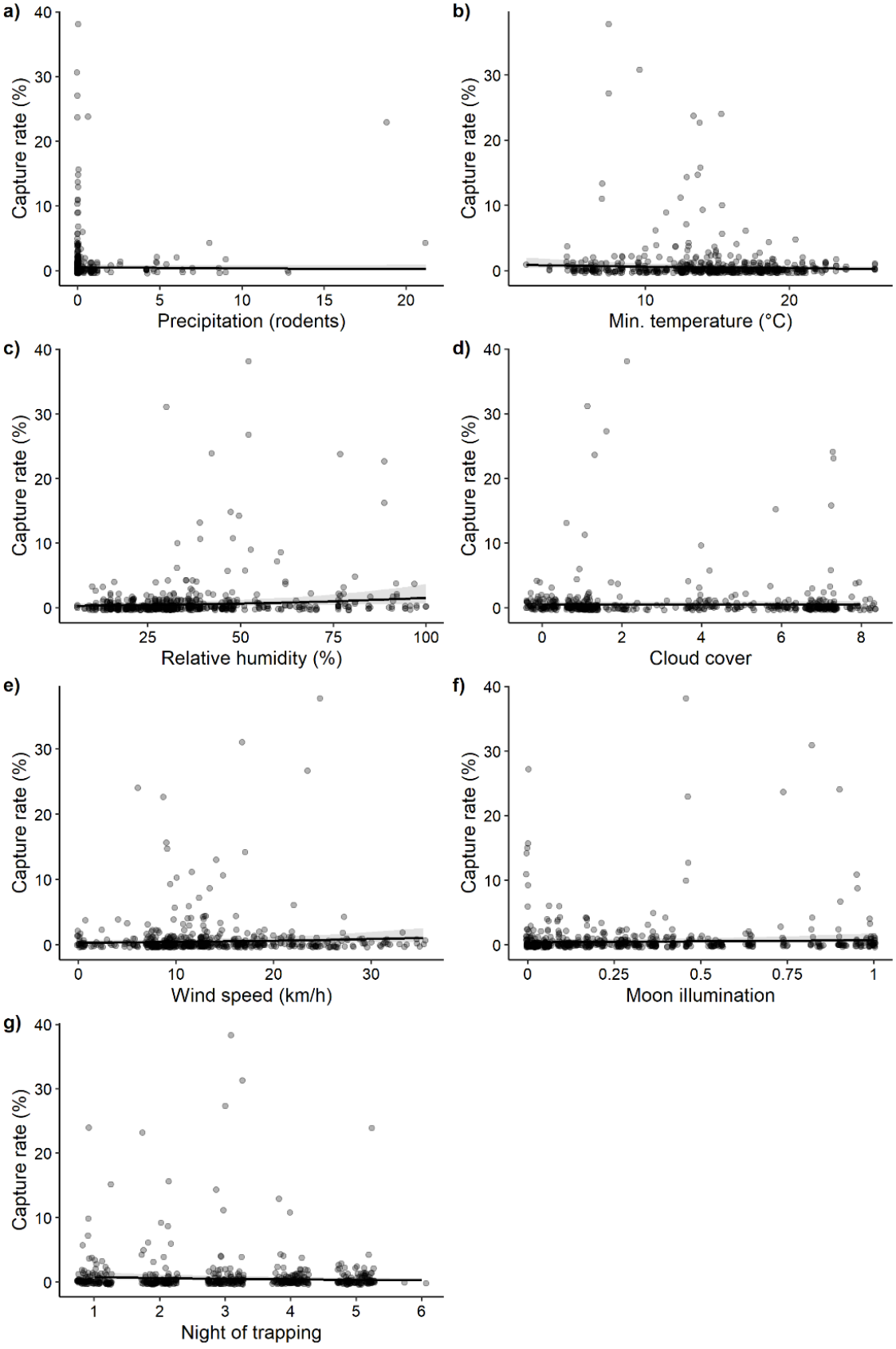

Figure S10: Response of capture rates of the rodent family to; a) precipitation in the 24 hours prior to 00:00; b) minimum overnight temperature; c) relative humidity at 21:00; d) cloud cover at 21:00; e) wind speed at 21:00; f) moon illumination between 1700 and 2100; g) night of trapping within a single consecutive period