Supplementary Information

ProxLogs: Miniaturised proximity loggers for monitoring association behaviour in small animals L. Kirkpatrick, I. Herrera-Olivares, A. Massawe, C. Sabuni, H. Leirs, R. Berkvens, M. Eens, M. Weyn



Figure S1: Comparing modeled power consumption with actual power draw as advertisement interval increases. At all times actual power draw closely approximated that predicted by our model.

Appendix S2: Collision rates statistical model.

Collision probability = $1 - e^{-N\lambda 2d_p}$

where: N = number of logger devices d_p = broadcast time on a channel $\lambda = \frac{1}{T_{advInterval}}$

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Figure S3: Left: landscape showing habitat in which trials were carried out. Right: Prototype loggers (two with epoxy) used in trials.

Appendix S4: Calibration routine.

The calibration was carried out by laying out a grid as shown in Fig. S5 below. Loggers were placed in each of the five place marked positions. Loggers were moved along each arm of the cross with the central logger staying stationary. Loggers with distance A separating them increased by 10 cm each movement until they were one meter apart, at which point they increased by 20 cm each movement. Distance B was calculated as $\sqrt{8/4A}$, distance C was calculated as $\sqrt{8/2A}$. In order to maintain these distances loggers were moved 7.07 cm long each arm. All calculations were carried out in R (R Core Development Team, v 3.4.4)



Figure S5: Grid layout used for performing calibrations.



Figure S6: Setup of the indoor arena.



Figure S7: Picture of an example collar and a multimammate mouse wearing a collar.

Table S8: Details of the tagged multimammate mice.

	Mouse body mass (g)		Total contacts recorded	
Mouse logger ID	at start	at end	close (RSSI>60 dB)	very close (RSSI> 50 dB)
4	75	75	276	26
6	95	85	230	34
8	110	120	88	4
10	95	85	239	26



Figure S9: Picture of starling with a logger attached as a backpack.

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Figure S10: Layout of the starling aviary for the field trial. The feeding station is in the centre of the aviary, with a stationary logger attached. Nest boxes are arranged along one side of the aviary, with a camera trap placed in front of each. Blue squares represent the stationary loggers while yellow squares represent the mobile loggers. A gateway was placed adjacent to the feeding station but on the outside of the aviary to allow easy access and ensure that mobile loggers would be downloaded. In addition, data could be read and logger settings adjusted through the use of the mobile application.