

A 24-year record of female reproductive dynamics in two sympatric mouse lemur species in northwestern Madagascar

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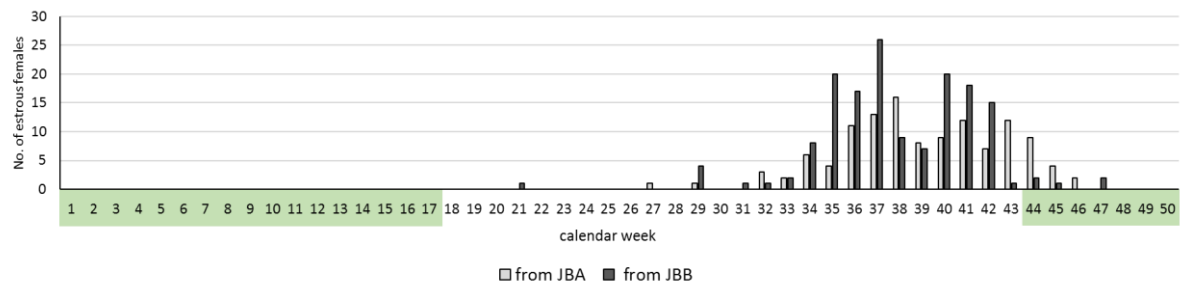
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Appendix S1. Trapping effort and the number of female reproductive records per year between 1995 – 2018 in Ankarafantsika, Madagascar

Year	Traps installed		Female reproductive records				Sum records
	JBA	JBB	<i>M. murinus</i>	<i>M. ravelobensis</i>	<i>M. ravelobensis</i>	<i>M. murinus</i>	
			JBA	JBA	JBB	JBB	
1995	1080	120	39	2	18	0	59
1996	2088	1350	46	26	68	0	140
1997	3249	1183	63	41	71	0	175
1998	3000	2730	112	33	155	0	300
1999	1100	1530	84	7	48	0	139
2000	2100	1810	59	46	143	0	248
2001	2500	1991	52	76	115	0	243
2002	600	843	13	12	47	0	72
2003	3300	1900	76	98	132	0	306
2004	2100	1538	52	57	93	0	202
2005	2100	1900	44	41	105	0	190
2006	1500	1086	46	31	94	0	171
2007	3300	2986	112	93	235	0	440
2008	2100	1448	77	84	142	0	303
2009	600	543	14	29	40	0	83
2010	1800	1629	65	102	167	0	334
2011	2250	2100	60	59	70	0	189
2012	0	0	0	0	0	0	0
2013	270	180	8	5	14	0	27
2014	900	0	11	8	0	0	19
2015	4140	1980	160	238	82	4	484
2016	1890	900	54	75	13	5	147
2017	180	0	4	12	0	0	16
2018	270	360	6	12	15	1	34
Sum	42417	30107	1257	1187	1867	10	4321

Appendix S2. Number of estrous females of *M. ravelobensis* trapped in JBA and JBB across all study years



Appendix S3. Statistical results on the relationship between the onset of yearly estrous activity (calendar week) for the eight years with weekly trapping records and rainfall (total rainy season or monthly amounts, upper section) or the mean minimum and maximum temperature (T) (middle and lower section) in Ankarafantsika, Madagascar. Correction of p-values by Bonferroni-Holm method (Holm 1979).

	r_{Spearman}	p-value uncorrected	p-value corrected
Total rainfall	0.728895	0.0402*	0.0402*
Rainfall November	0.086479	0.8387	1
Rainfall December	0.123542	0.7707	1
Rainfall January	0.148250	0.7261	1
Rainfall February	0.926562	0.0009***	0.0009***
Rainfall March	0.024708	0.9537	1
Rainfall April	0.172958	0.6821	1
Rainfall May	-0.679366	0.0639	0.5751
Rainfall June	no rainfall		
Rainfall July	0.258806	0.5360	1
Rainfall August	-0.427960	0.2902	1
Mean minimum T - November	0.358271	0.3835	0.767
Mean minimum T - December	0.534419	0.1724	1
Mean minimum T – January	0.528396	0.1782	1
Mean minimum T – February	0.552307	0.2738	1
Mean minimum T – March	0.571704	0.1387	1
Mean minimum T – April	0.704187	0.0512	0.0512
Mean minimum T – May	0.432395	0.2846	0.8538
Mean minimum T – June	0.329351	0.4257	0.4257
Mean minimum T – July	0.443889	0.2706	1
Mean minimum T – August	0.500156	0.2069	1
Mean maximum T - November	-0.250078	0.5502	1
Mean maximum T - December	-0.086479	0.8387	0.8387
Mean maximum T – January	-0.111187	0.7932	1
Mean maximum T – February	-0.172958	0.6821	1
Mean maximum T – March	-0.370625	0.3661	1
Mean maximum T – April	-0.691833	0.0573	0.0573
Mean maximum T – May	-0.605354	0.1118	1
Mean maximum T – June	-0.422564	0.2970	1
Mean maximum T – July	-0.323137	0.4350	1
Mean maximum T – August	-0.457104	0.2548	1

*: $p < 0.05$, ***: $p < 0.001$

Appendix S4. Impacts on the early conception likelihood (ECL) in *Microcebus ravelobensis* for 13 years between 1998 – 2015 in Ankarafantsika, Madagascar – results from uni- or bivariate GLM models

ID	Model	AIC	factor	Estimate	Std. Error	z value	P-value	Effect
0	body mass & study site	141.73	Intercept	-11.0387	2.2801	-4.841	1.29e-06	high > low
			body mass	0.1546	0.0350	4.422	9.78e-06****	
			study site	0.4880	0.4562	1.070	0.2850	
1	total rainfall rainy season	167.95	Intercept	-0.9921	0.7054	-1.406	0.1600	
			totalrain	-0.0002	0.0004	-0.430	0.6670	
2	rainfall November	166.44	Intercept	-0.6397	0.5310	-1.205	0.2280	
			rainNov	-0.0051	0.0040	-1.273	0.2030	
3	rainfall December	167.87	Intercept	-1.0624	0.5275	-2.014	0.0440	
			rainDec	-0.0008	0.0018	-0.451	0.6520	
4	rainfall January	167.89	Intercept	-1.1172	0.4436	-2.519	0.0118	
			rainJan	-0.0003	0.0008	-0.418	0.6763	
5	rainfall February	167.79	Intercept	-1.0934	0.4110	-2.660	0.0078	
			rainFeb	-0.0005	0.0009	-0.522	0.6014	
6	rainfall March	167.89	Intercept	-1.4429	0.4156	-3.472	0.0005	
			rainMar	0.0007	0.0017	0.432	0.6656	
7	rainfall April	164.14	Intercept	-1.7633	0.3285	-5.368	7.94e-08	high > low
			rainApr	0.0118	0.0060	1.967	0.0492*	
8	rainfall May	165.65	Intercept	-1.4040	0.2122	-6.617	3.68e-11	
			RainMay	0.0340	0.0210	1.614	0.1070	
9	rainfall June	166.07	Intercept	-1.2858	0.1938	-6.636	3.22e-11	no rain in June
			RainJun	NA	NA	NA	NA	
10	rainfall July	166.58	Intercept	-1.2025	0.2029	-5.927	3.08e-09	
			RainJul	-0.02319	0.0210	-1.106	0.2690	
11	rainfall August	167.90	Intercept	-1.3173	0.2094	-6.289	3.19e-10	
			RainAug	0.0271	0.0649	0.418	0.6760	
12	Minimum T November	167.86	Intercept	-3.2702	4.3172	-0.760	0.4470	
			minTNov	0.0906	0.1956	0.463	0.6430	
13	Minimum T December	167.54	Intercept	2.6937	5.4701	0.492	0.6220	
			MinTDec	-0.1733	0.2383	-0.727	0.4670	
14	Minimum T January	166.93	Intercept	5.9306	6.7336	0.881	0.3780	
			MinTJan	-0.3097	0.2894	-1.070	0.2840	
15	Minimum T February	167.29	Intercept	3.3430	5.1913	0.644	0.5200	
			MinTFeb	-0.2001	0.2247	-0.891	0.3730	
16	Minimum T March	159.5	Intercept	10.5872	5.4896	1.929	0.0538	low > high
			MinTMar	-0.5179	0.2417	-2.143	0.0321*	
17	Minimum T April	166.89	Intercept	2.4941	3.4895	0.715	0.4750	
			MinTApr	-0.1739	0.1608	-1.081	0.2800	
18	Minimum T May	167.49	Intercept	0.7740	2.7133	0.285	0.7750	
			MinTMay	-0.1026	0.1352	-0.759	0.4480	
19	Minimum T June	165.92	Intercept	3.1818	3.1092	1.023	0.3060	

			TminJun	-0.2563	0.1790	-1.432	0.1520	
20	Minimum T July	166.66	Intercept	2.2881	3.0512	0.750	0.4530	
			TminJul	-0.2149	0.1839	-1.168	0.2430	
21	Minimum T August	168.07	Intercept	-1.0592	3.4162	-0.310	0.7570	
			MinTAug	-0.0134	0.2019	-0.066	0.9470	
22	Maximum T November	167.58	Intercept	-5.4655	6.0051	-0.910	0.3630	
			MaxTNov	0.1156	0.1658	0.697	0.4860	
23	Maximum T December	167.74	Intercept	-4.8921	6.3099	-0.775	0.4380	
			MaxTDec	0.1060	0.1851	0.572	0.5670	
24	Maximum T January	168.0	Intercept	-0.2526	0.7597	-0.067	0.9460	
			MaxTJan	-0.0322	0.11708	-0.275	0.7830	
25	Maximum T February	167.04	Intercept	-2.0148	4.3498	-0.463	0.6430	
			MaxTFeb	0.0230	0.1369	0.168	0.8670	
26	Maximum T March	168.02	Intercept	-0.0737	5.2672	-0.014	0.9890	
			MaxTMar	-0.0369	0.1605	-0.230	0.8180	
27	Maximum T April	166.78	Intercept	-9.9371	7.6824	-1.293	0.1960	
			MaxTApr	0.2534	0.2246	1.128	0.2590	
28	Maximum T May	167.86	Intercept	-4.1507	6.2066	-0.669	0.5040	
			MaxTMay	0.0848	0.1834	0.462	0.6440	
29	Maximum T June	167.4	Intercept	-8.5157	8.8625	-0.961	0.3370	
			MaxTJun	0.2260	0.2766	0.817	0.4140	
30	Maximum T July	167.48	Intercept	-9.8384	11.1319	-0.884	0.3770	
			MaxTJul	0.2703	0.3516	0.769	0.4420	
31	Maximum T August	166.11	Intercept	-9.8537	6.1907	-1.592	0.1110	
			MaxTAug	0.2598	0.1872	1.388	0.1650	

*: $p < 0.05$, ****: $p < 0.0001$

Appendix S5. Impacts on the early conception likelihood (ECL) in *Microcebus ravelobensis* for 13 years between 1998 – 2015 in Ankarafantsika, Madagascar – results from the full model: $ECL \sim \text{body mass} + \text{rainApril} + \text{minTMarch}$

	k	df	logLik	AICc	$\Delta AICc$	ω	AIC	body mass		rainApril		minTMarch	
								Estimate	P-value	Estimate	P-value	Estimate	P-value
models with $\Delta AICc < 2$	2	3	-66.251	138.7	0	0.719	138.5	0.1431	3.89e-05			-0.4246	0.0893
	3	4	-66.135	140.5	1.87	0.281	140.27	0.1410	5.5e-05	0.0033	0.631	-0.3961	0.114

	k	df	logLik	AICc	$\Delta AICc$	ω	AIC	factor	Estimate	Std. Error	z value	P-value	Effect
best model	2	3	-66.251	138.7	0	0.719	138.5	Intercept	-0.2954	6.1413	-0.048	0.9616	
								body mass	0.1431	0.0348	4.114	3.89e-05****	high > low
								minTMarch	-0.4246	0.2499	-1.699	0.0893	

*: $p < 0.05$, ****: $p < 0.0001$

Appendix S6. Impacts on the early conception likelihood (ECL) in *Microcebus murinus* for 13 years between 1998 – 2015 in Ankarafantsika, Madagascar – results from univariate GLMM (body mass) and GLM (climate) models

ID	Model	AIC	factor	Estimate	Std. Error	z value	P-value	Effect
0	body mass	71.7	Intercept	1.3774	3.2721	0.421	0.6740	
			body mass	0.0012	0.0585	0.020	0.9840	
1	total rainfall rainy season (log-transformed)	70.73	Intercept	2.057	7.796	0.264	0.7920	
			log(totrain)	-0.108	1.045	-0.103	0.9180	
2	rainfall November	70.74	Intercept	1.2968	0.8149	1.591	0.1120	
			rainNov	-0.0004	0.0063	-0.058	0.9530	
3	rainfall December	70.38	Intercept	1.7627	0.9021	1.954	0.0507	
			rainDec	-0.0017	0.0028	-0.610	0.5417	
4	rainfall January	70.51	Intercept	1.5072	0.6037	12.497	0.0125	
			rainJan	-0.0004	0.0008	-0.498	0.6187	
5	rainfall February	70.71	Intercept	1.3553	0.6723	2.016	0.0438	
			rainFeb	-0.0002	0.0012	-0.172	0.8634	
6	rainfall March	70.54	Intercept	1.0403	0.5622	1.850	0.0642	
			rainMar	0.0009	0.0021	0.437	0.6620	
7	rainfall April	66.53	Intercept	0.4214	0.4848	0.869	0.3847	
			rainApr	0.0227	0.0117	1.933	0.0532	
8	rainfall May	70.55	Intercept	1.2062	0.3196	3.775	0.0002	
			RainMay	0.0219	0.0539	0.406	0.6846	
9	rainfall June	68.74	Intercept	1.253	0.303	4.134	3.57e-05	no rain in June
			RainJun	NA	NA	NA	NA	
10	rainfall July	65.47	Intercept	1.4989	0.3435	4.363	1.28e-05	
			RainJul	-0.6535	0.5158	-1.267	0.2050	
11	rainfall August	68.66	Intercept	1.168	0.306	3.815	0.0001	
			RainAug	2.733	329.682	0.008	0.9934	
12	Minimum T November	68.54	Intercept	12.2213	7.6212	1.604	0.1090	
			minTNov	-0.4902	0.3388	-1.447	0.1480	
13	Minimum T December	70.23	Intercept	-5.0191	8.7417	-0.574	0.5660	
			MinTDec	0.2719	0.3795	0.716	0.4740	
14	Minimum T January	70.73	Intercept	0.0997	12.3085	0.008	0.9940	
			MinTJan	0.0493	0.5258	0.094	0.9250	
15	Minimum T February	70.46	Intercept	-4.4300	10.5189	-0.421	0.6740	
			MinTFeb	0.2439	0.4519	0.540	0.5890	
16	Minimum T March	70.55	Intercept	3.611	5.193	0.695	0.4870	
			MinTMar	-0.102	0.224	-0.456	0.6490	
17	Minimum T April	66.06	Intercept	-11.5065	6.0301	-1.908	0.0564	high > low
			MinTApr	0.5796	0.2758	2.101	0.0356*	
18	Minimum T May	70.70	Intercept	2.2110	4.5821	0.483	0.6290	
			MinTMay	-0.0477	0.2271	-0.210	0.8340	
19	Minimum T June	70.50	Intercept	-1.1191	4.8370	-0.231	0.8170	
			TminJun	0.1367	0.2789	0.490	0.6240	
20	Minimum T July	70.24	Intercept	-1.8800	4.4424	-0.423	0.6720	
			TminJul	0.1885	0.2679	0.704	0.4820	
21	Minimum T August	65.94	Intercept	-16.0860	9.0125	-1.785	0.0743	
			MinTAug	1.0309	0.5393	1.911	0.0560	

22	Maximum T November	65.80	Intercept MaxTNov	21.532 -0.556	10.144 0.276	2.123 -2.015	0.0338 0.0439*	low > high
23	Maximum T December	69.64	Intercept MaxTDec	11.2904 -0.2927	9.7994 0.2848	1.152 -1.028	0.2490 0.3040	
24	Maximum T January	67.32	Intercept MaxTJan	-9.1917 0.3250	5.6629 0.1772	-1.623 1.834	0.1046 0.0666	
25	Maximum T February	59.71	Intercept MaxTFeb	-27.0527 0.9062	10.4429 0.3381	-2.591 2.680	0.0096 0.0074**	high > low
26	Maximum T March	69.40	Intercept MaxTMar	-9.4243 0.3261	9.1189 0.2791	-1.033 1.168	0.3010 0.2430	
27	Maximum T April	67.39	Intercept MaxTApr	27.6984 -0.7753	15.1923 0.4438	1.823 -1.747	0.0683 0.0806	
28	Maximum T May	64.89	Intercept MaxTMay	28.7766 -0.8123	12.7111 0.3727	2.264 -2.179	0.0236 0.0293*	low > high
29	Maximum T June	69.21	Intercept MaxTJun	18.9414 -0.5505	14.6602 0.4552	1.292 -1.210	0.1960 0.2260	
30	Maximum T July	67.162	Intercept MaxTJul	39.2166 -1.1931	21.4785 0.6731	1.826 -1.772	0.0679 0.0763	
31	Maximum T August	69.99	Intercept MaxTAug	11.5132 -0.3102	11.9076 0.3592	0.967 -0.864	0.3370 0.3880	

*: $p < 0.05$, **: $p < 0.01$

Appendix S7 Impacts on the early conception likelihood (ECL) in *Microcebus murinus* for 13 years between 1998 – 2015 in Ankarafantsika, Madagascar – results from the full model: $ECL \sim \text{minTApril} + \text{MaxTNovember} + \text{MaxTFebruary} + \text{MaxTMay}$

								minTApril		MaxTNovember		MaxTFebruary		MaxTMay	
								Estimate	P-value	Estimate	P-value	Estimate	P-value	Estimate	P-value
models with $\Delta AICc < 2$	1	2	-27.856	59.9	0	0.398	59.71					0.9062	0.0074		
	2	3	-27.238	60.9	0.97	0.245	60.48			-0.3459	0.2771	0.7154	0.0322		
	2	3	-27.411	61.2	1.32	0.206	60.82	0.3131	0.3357			0.7430	0.0042		
	2	3	-27.713	61.8	1.92	0.152	61.43					0.7519	0.0693	-0.2406	0.5959

								factor	Estimate	Std. Error	z value	P-value	Effect
best model	1	2	-27.856	59.9	0	0.398	59.71	Intercept	-27.0527	10.4429	-2.591	0.0096	
								MaxTFeb	0.9062	0.3381	2.680	0.0074**	high > low

**: $p < 0.01$