

## Supplementary Materials for

### **Routine allomaternal nursing in a free-ranging Old World monkey**

Zuofu Xiang\*, Penglai Fan, Haochun Chen, Ruoshuang Liu, Bo Zhang, Wanji Yang, Hui Yao,  
Cyril C. Grueter, Paul A. Garber, Ming Li\*

\*Corresponding author. Email: xiangzf@csuft.edu.cn (Z.X.); lim@ioz.ac.cn (M.L.)

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## Supplementary Online Materials

**Table S1. The infant's mother, (potential) allonurser, proportion of allomaternal nursing (based on time spent nursing), and kin relationship between the allonurser and the infant's mother in the social units of a free-ranging group of golden snub-nosed monkeys (*R. roxellana*).** We calculated the proportion of allonursing for all infants at two-week intervals using the formula,  $P_{ij} = 100 * n_{ij} / N_i$ , where  $P_{ij}$  = proportion (%) of infant A's allonursing in  $i$  period from allomother  $j$ ,  $n_{ij}$  = duration of infant A's allonursing in  $i$  period from allomother  $j$ ,  $N_i$  = total duration suckling of infant A's from both mother and allomother in  $i$  period. The mean proportion of allonursing from each two-week interval for each donor was used as the total allonursing score from that female. The total proportion of allonursing for a particular infant was summed from all donors.

Social Unit	Year	Mother of infant	(Potential) Allonurser	Allomaternal nursing %	Total allomaternal nursing %	Kin relationship***	
BT	2012	HH2	TT1	7.7	10.7	M-D	
			YY2	1.4		U	
			DWB	1.6		U	
	2013	DWB	HH2	2.5	5.4	U	
			DWB	2.9		S-S	
			HH2	2.3	5.1	U	
			YY2	2.8		S-S	
			YY2	2.3		U	
HH4	2014	HH2	YY2	2.3	4.8	U	
			DWB	2.5		U	
			DWB	HH2	3.6	3.6	U
				TJ	0.0		U
	2015	DWB	YY2	0.0	2.8	S-S	
			TJ	0.0		U	
			HH2	4.6	2.8	M-D	
			DWB	0.0		U	
			TJ*	YY2	0.0	4.6	U
				DWB	0.0		U
DD	2015	DWB	HH2	4.6	5.4	M-D	
			DWB	0.0		S-S	
			YY2	0.0	5.4	U	
			TJ	5.4		U	
	2016	HHE	-	0.0	0.0	-	
			DWB	7.6		M-D	
			AL*	HH2	2.1	9.7	U
				YY2	0.0		U
				TJ	0.0		S-S
				JJ1	8.8		M-D
2012	GG*	LN	4.5	13.3	U		
		YY1	0.0		U		
		HH1	0.0		U		
		XL	0.0		U		

			HH1	15.9		M-D
			YY1	3.1		U
		XL	LN	0.0	19.0	U
			JJ1	0.0		U
			GG	0.0		U
			XL	3.8		U
		YY1	GG	0.0	3.8	U
			LN	0.0		U
	2013		GG	4.1		U
		LN	XL	0.0	4.1	U
			YY1	0.0		U
			LN	3.0		U
		GG	XL	0.0	3.0	U
			YY1	0.0		U
	2014		YY1	2.9		U
		XL	LN	0.0	2.9	U
			GG	0.0		U
			GG	3.2		U
		LN	YY1	0.0	4.8	U
			SS	1.6		U
			GG	1.9		U
	2015	YY1	LN	0.0	1.9	U
			SS	0.0		U
			GG	2.8		S-S
		SS*	YY1	0.0	4.9	U
			LN	2.1		U
			SS	3.1		S-S
	2016	GG	YY1	2.3	9.0	U
			LN	3.6		U
			XH**	78.8		M-D
		HH3	XB	5.5	84.3	U
	2012		XH	2.4		S-S
		XB*	HH3	0.0	2.4	U
			XH	3.3		M-D
			XB	6.8	10.1	U
			HH3	4.6		M-D
	2013	XB	XH	0.0	4.6	S-S
			HH3	2.3		U
			XB	0.0	2.3	U
			-	0.0	0.0	-
		JJ2*				
			XY	2.7		U
		XE*	XB	1.8	4.5	U
			XH	0.0		U
			XY*	3.1	5.3	U
	2014		XE			

			XH	2.2		U
			XB	0.0		U
			XH	-	0.0	-
	2015		ME	2.1	4.4	U
		XB	XE	2.3		U
			XB	2.5	2.5	U
		ME*	XE	0.0		S-S
NN	2016		XY	2.5	2.7	U
			JJ2	2.9	2.9	U
			TT2	4.1		S-S
	2012		HHE	2.1	6.2	U
		BB	NN1	0.0		U
			LL	0.0		U
			BB	8.5		M-D
			HHE	3.2	14.5	U
		YB*	NN1	2.7		U
			LL	0.0		U
			TT2	0.0		U
			NN1	0.0		U
XX			HHE	0.0	0.0	U
		LL	TT2	0.0		U
			YB	0.0		U
	2013		BB	0.0		U
			HHE	2.4		S-S
			LL	0.0		U
		NN1	TT2	0.0	2.4	U
			YB	0.0		U
			BB	0.0		U
			NN1	3.7		S-S
			BB	3.0		U
		HHE	LL	0.0	6.3	U
			TT2	0.0		U
			YB	0.0		U
			BB	2.7		S-S
			NN1	0.0	2.7	U
		TT2	LL	0.0		U
			HHE	0.0		U
WY	2014		HHE	3.9		U
			TT2	2.1	13.9	S-S
		BB	YB	7.8		M-D
			NN1	0.0		U
GE (Gu-Er)	2015		TT2	0.0	0.0	U
		NN1	BB	0.0		U

	TT2	BB	2.6		U
		NN1	0.0	2.6	S-S
	LL	-	0.0	0.0	-
	YB	BB	5.6		M-D
		EB	0.0	5.6	S-S
YH	XF*	-	0.0	0.0	-
	EB*	YB	3.5	3.5	S-S

\*primiparous mothers.

\*\*give a stillborn

\*\*\*The kinship between mother and allonuser. M-D:Mother-daughter; S-S:Sister- sister; U: Unrelated.

**Table S2. AICc-ranked candidate model set showing relative importance of the following parameters on whether a female acted as allonurser.**

Model	Parameters ( <i>k</i> )	Log likelihood	AICc	$\Delta_i$	$\omega_i$
Relatedness, reciprocity, age of offspring, reproductive history	6	-26.8	66.43	0	0.8
Relatedness, reciprocity, reproductive history	5	-29.97	70.53	4.1	0.1
Relatedness, reciprocity, age of offspring	5	-30.38	71.35	4.92	0.07
Relatedness, reciprocity,	4	-32.21	72.8	6.38	0.03

Submodels were derived from a global model using a cutoff of 2AICc greater than the best-fitting model.

**Table S3. Social and ecological traits of primate species for which regular allomaternal nursing has been reported.**

<b>Taxa</b>	<b>Species</b>	<b>% nursing by allonurser</b>	<b>Breeding Season (in mo)</b>	<b>Encephalization quotient</b>	<b>Philopatry</b>	<b>Habitat</b>	<b>Median litter size</b>
Prosimian	<i>Microcebus murinus</i>	3.3-16.7 (4)	1 (4)	1.4 (47)	Female (4)	Seasonal (4)	2.05 (36)
	<i>Varecia rubra</i>	Common (5)	1 (5)	1.4 (47)	Female (5)	Seasonal (5)	2.11 (36)
New World monkey	<i>Cebus olivaceus</i>	11.4 (6)	4 (45)	2.4-2.8 (47)	Female (6)	4m dry & 6m wet (6)	1.01 (36)
	<i>Cebus nigrinus</i>	13 (8)	5 (8)	2.4-2.8 (47)	Female (8)	Seasonal (48)	1.05 (36)
	<i>Cebus capucinus</i>	12.4 (9)	7 (46)	2.4-2.8 (47)	Female (9)	5m dry & 7m wet (9)	1 (36)
	<i>Saimiri boliviensis</i>	5-10 (7)	2 (7)	2.3 (47)	Female (7)	Seasonal (7)	1.02 (36)
Old World monkey	<i>Rhinopithecus roxellana</i>	4.8 (this study)	3 (26)	-	Female (24)	Seasonal (21)	1 (36)
Ape	<i>Homo sapiens</i>	Common (10)	NA	7.4-7.8 (47)	Female (49)	Seasonal (10)	1 (36)

**Table S4. Adult females' reproductive history in focal group that is composed of four to six OMUs.**

Female	Abbreviation	Reproductive Status a				
		2012	2013	2014	2015	2016
Ni-Ni	NN1		M		M	
Long-Long	LL		M			
Hong-Hai-Er	HHE		M			
Tian-Tian	TT2		M		M	
Bao-Bao	BB	M		M		
Yi-Bao	YB		P		M	
Er-Bao	EB				P	
Jun-Jun	JJ1					
Si-Si	SS				P	
Guai-Guai	GG	P		M		M
Xiao-Li	XL	M		M		
Hu-Hu	HH1					
Lao-Ni	LN		M		M	
Ying-Ying	YY1		M		M	
Da-Da	DD1					
Tuan-tuan	TT1					
Tuan-Jie	TJ				P	
Yin-Yin	YY2		M		M	
Duan-Wei-Ba	DWB		M		M	
Ai-Li	AL					P
Hong-Hai-Er	HHE				M	
Tuan-Jie	TJ				P	
Huan-Huan	HH2	M		M	M	
Xiao-Bei	XB	P	M		M	
Huan-Huan	HH3	M	M			
Xiao-Hu	XH	P	M		M	
Xue-Er	XE			P		
Xin-Feng	XF				P	
Mi-Er	ME				P	
Xiao-Yan	XY			P		M
Jing-Jing	JJ2			P		M

a, P, a primiparous female during the year when she gives birth, and M for multiparous during each subsequent year when she gives birth;