

Appendix

Probability of mt-type extinction

For example, in the record of 2001, the Bossou community consisted of 4, 1, 1, 2 and 1 female of the Bs-TJFK, Bs-N, Bs-P, Bs-V, and Bs-Y mt-types, respectively. Consequently, $n = 9$, $n_1 = 3$ (i.e. Bs-N, Bs-P, and Bs-Y), $n_2 = 1$ (i.e. Bs-V), and $n_s = 5$.

$$P_{obs} = {}_3C_1 / {}_9C_1 = 0.33, \text{ when } n_d = 1,$$

$$P_{obs} = [(9-3)3+1+{}_3C_2] / {}_9C_2 = 0.61, \text{ when } n_d = 2.$$

The hypothetical even composition of mt-type, under $n = 9$ and $n_s = 5$, is as follows:

$$x = 2,$$

$$n_2 = \text{MOD}(9/5) = 4,$$

$$n_1 = 1.$$

Then,

$$P_{exp} = {}_1C_1 / {}_9C_1 = 0.11, \text{ when } n_d = 1,$$

$$P_{exp} = \{(9-4)1+4\} / {}_9C_2 = 0.33, \text{ when } n_d = 2.$$

Demographic analysis

For example, three mt-types are observed from a community consisting of 7 individuals such as shown in the table below.

Mt-types	Male individuals	Female individuals
A	MA1	FA1, FA2
B	MB1	FB1(emigrant)
C	MC1	FC1

If FB1 is an emigrant ($e = \text{FB1}$), FB1 has three opposite sex and four same sex, then $[o]_{\text{DTN}}(\text{FB1})$ consists of two males of mt-type A and C, i.e. $\{[o]_{\text{DTN}}(\text{FB1}) \mid \text{MA1}, \text{MA2}\}$. Note that a male of mt-type B cannot be a candidate for FB1 under DTN conditions. Consequently, the numbers of the same sex, $[n_s]_{\text{DTN}}(o)$, corresponding to each $[o]_{\text{DTN}}(\text{FB1})$ are as follows:

Emigrant(e)= FB1	Opposite sex, [o] _{DTN(FB1)}	Same sex, [s] _{DTN(FB1)}	[n_s] _{DTN(o)}
	MA1	FB1, FC1	[n_s] _{DTN(MA1)=2}
	MC1	FA1, FA2, FB1	[n_s] _{DTN(MC1)=3}
Total number	[n_o] _{DTN(FB1)=2}	-	$\sum_{[o]_{DTN(FB1)}}^{[n_o]_{DTN(FB1)}} \frac{1}{[n_s]_{DTN(o)}} = 1/2 + 1/3$

For the SRM in case that FB1 is emigrant,

$$[\text{SRM}]_{\text{DTN}(e)} = \frac{1}{[n_o]_{\text{DTN}(e)}} \sum_{[o]_{\text{DTN}(e)}}^{[n_o]_{\text{DTN}(e)}} \frac{1}{[n_s]_{\text{DTN}(o)}}$$

$$[\text{SRM}]_{\text{DTN}(\text{FB1})} = (1/2)(1/2 + 1/3).$$

Supplement table 1. Sex Ratio for mate (SRM) in Bossou community when independent individuals disappeared (17 cases)

Disappeared time		Individuals which disappeared (×8 years)		Males (×8 years)			Females (×8 years)			Opposite/same -sex ratio (SRM)	
year	month	sex	Member	n same mt type	n different mt type	member	n same mt type	n different mt type	DTN	MIX	
2004	11	Ft	F	TA, FF, YL	2	1	Fn, Jr, Vl, Yo, Pm	2	3	0.20	0.50
2004	3	Vv	F	TA, FF, YL	0	3	Fn, Ft, Jr, Vl, Yo, Pm	1	5	0.22	0.43
2001	12	Nt	F	TA, FF, YL, PO	0	4	Ka, Nn, Fn, Ft, Jr, Ju, Vl, Vv, Yo, Pm	1	9	0.13	0.36
2001	12	Ju	F	TA, FF, YL, PO	2	2	Ka, Nn, Nt, Fn, Ft, Jr, Vl, Vv, Yo, Pm	4	6	0.10	0.36
2000	10–2001/4	Pl	F	TA, FF, YL	0	3	Ka, Nn, Fn, Ft, Jr, Vl, Vv, Yo, Pm	1	8	0.15	0.30
1999	8	VI	M	TA, FF, YL	0	3	Ka, Nn, Fn, Ft, Jr, Vl, Vv, Yo, Pm, Pl	2	8	0.39	2.50
1996	3–5	NA	M	TA, FF, VI	0	3	Ka, Nn, Fn, Jr, Vl, Yo, Pm, Pl	1	7	0.37	2.00
1993	1	Yu	F	TA, FF, Na	0	3	Ka, Nn, Fn, Jr, Ja, Vl, Yo, Pm	1	7	0.17	0.33

1993	2	Ja	F	TA, FF, Na	2	1	Ka, Nn, Fn, Jr, VI, Yo, Yu, Pm	3	5	0.13	0.33
1991	11	PR	M	TA, FF	0	2	Ka, Nn, Fn, Jr, Ja, VI, Yo, Pm	1	7	0.71	2.67
1991	3	Ki	F	TA, FF, PR	2	1	Ka, Nn, Fn, Jr, VI, Yo, Pm	3	4	0.14	0.38
1988	4-1989/10	JZ	M	TA	1	0	Ka, Ki, Nn, Fn, Jr, VI, Yo, Pm	4	4	0.50	4.00
1980	3-	Fi	F	TA, JM, VU	2	1	Ka, Kr, Nn, Fn, Jr, VI, Yo, Pm	4	4	0.13	0.33
1980	3-	Kr	F	TA, JM, VU	2	1	Ka, Nn, Fn, Fi, Jr, VI, Yo, Pm	4	4	0.13	0.33
1980	3-	JM	M	TA, VU	1	1	Ka, Kr, Nn, Fn, Fi, Jr, VI, Yo, Pm	5	4	0.38	3.00
1980	3-	VU	M	TA, JM	0	2	Ka, Kr, Nn, Fn, Fi, Jr, VI, Yo, Pm	1	8	0.75	3.00
1977	5-	NO	M	TA	0	1	Ka, Kr, Nn, Fn, Jr, VI, Yo, Pm	1	7	0.79	4.00

DTN = The number was counted under mt type distinction, i.e. opposite-sex individuals with the same mt type were not counted as mating candidates; MIX = the number was counted regardless of mt type, i.e. opposite-sex individuals in the same mt type were counted as mating candidates.