

AUTO

POPULATION SIZE, MIGRATION, DIVERGENCE, ASSIGNMENT, HISTORY

Bayesian inference using the structured coalescent

Migrate-n version 5.0.0a [May-20-2017]

Using Intel AVX (Advanced Vector Extensions)

Compiled for PARALLEL computer architectures

One master and 100 compute nodes are available.

Program started at Sun Aug 13 09:22:39 2017

Program finished at Sun Aug 13 10:44:23 2017 [Runtime:0000:01:21:44]



Options

Datatype:

DNA sequence data

Inheritance scalers in use for Thetas:

All loci use an inheritance scaler of 1.0

[The locus with a scaler of 1.0 used as reference]

Random number seed:

(with internal timer)

1487610690

Start parameters:

Theta values were generated

Using a percent value of the prior

M values were generated

Using a percent value of the prior

Connection matrix:

m = average (average over a group of Thetas or M,

s = symmetric migration M, S = symmetric 4Nm,

0 = zero, and not estimated,

* = migration free to vary, Thetas are on diagonal

d = row population split off column population, D = split and then migration

Population 1

1 Romanshorn_0 *

Order of parameters:

1 Θ_1

<displayed>

Mutation rate among loci:

Mutation rate is constant for all loci

Analysis strategy:

Bayesian inference

-Population size estimation:

Exponential Distribution

Proposal distributions for parameter

Parameter	Proposal
Theta	Metropolis sampling
M	Metropolis sampling
Divergence	Metropolis sampling
Divergence Spread	Metropolis sampling
Genealogy	Metropolis-Hastings

Prior distribution for parameter

Parameter	Prior	Minimum	Mean	Maximum	Delta	Bins	UpdateFreq
1	Theta -11 Uniform	0.000000	0.050	0.100	0.010	1500	0.20000

[-1 -1 means priors were set globally]

Markov chain settings:

Long chain

Number of chains

1

Recorded steps [a]

50000

Increment (record every x step [b])

200

Number of concurrent chains (replicates) [c]

2

Visited (sampled) parameter values [a*b*c]

20000000

Number of discard trees per chain (burn-in)

10000

Multiple Markov chains:

Static heating scheme

4 chains with temperatures

1000000.00

3.00

1.50

1.00

Swapping interval is 1

Print options:

Data file:

infile.0.7

Haplotyping is turned on:

NO

Output file:

outfile_0.7_0.4

Posterior distribution raw histogram file:

bayesfile

Raw data from the MCMC run:

bayesallfile_0.7_0.4

Print data:

No

Print genealogies [only some for some data type]:

None

Data summary

Data file:	infile.0.7
Datatype:	Sequence data
Number of loci:	100

Mutationmodel:

Locus	Sublocus	Mutationmodel	Mutationmodel parameters
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1	1	Jukes-Cantor	[Basefreq: =0.25]
2	1	Jukes-Cantor	[Basefreq: =0.25]
3	1	Jukes-Cantor	[Basefreq: =0.25]
4	1	Jukes-Cantor	[Basefreq: =0.25]
5	1	Jukes-Cantor	[Basefreq: =0.25]
6	1	Jukes-Cantor	[Basefreq: =0.25]
7	1	Jukes-Cantor	[Basefreq: =0.25]
8	1	Jukes-Cantor	[Basefreq: =0.25]
9	1	Jukes-Cantor	[Basefreq: =0.25]
10	1	Jukes-Cantor	[Basefreq: =0.25]
11	1	Jukes-Cantor	[Basefreq: =0.25]
12	1	Jukes-Cantor	[Basefreq: =0.25]
13	1	Jukes-Cantor	[Basefreq: =0.25]
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28	1	Jukes-Cantor	[Basefreq: =0.25]
29	1	Jukes-Cantor	[Basefreq: =0.25]
30	1	Jukes-Cantor	[Basefreq: =0.25]
31	1	Jukes-Cantor	[Basefreq: =0.25]
32	1	Jukes-Cantor	[Basefreq: =0.25]
33	1	Jukes-Cantor	[Basefreq: =0.25]
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35	1	Jukes-Cantor	[Basefreq: =0.25]
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37	1	Jukes-Cantor	[Basefreq: =0.25]
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40	1	Jukes-Cantor	[Basefreq: =0.25]
41	1	Jukes-Cantor	[Basefreq: =0.25]
42	1	Jukes-Cantor	[Basefreq: =0.25]
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44	1	Jukes-Cantor	[Basefreq: =0.25]
45	1	Jukes-Cantor	[Basefreq: =0.25]
46	1	Jukes-Cantor	[Basefreq: =0.25]
47	1	Jukes-Cantor	[Basefreq: =0.25]
48	1	Jukes-Cantor	[Basefreq: =0.25]
49	1	Jukes-Cantor	[Basefreq: =0.25]
50	1	Jukes-Cantor	[Basefreq: =0.25]
51	1	Jukes-Cantor	[Basefreq: =0.25]
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64	1	Jukes-Cantor	[Basefreq: =0.25]
65	1	Jukes-Cantor	[Basefreq: =0.25]
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69	1	Jukes-Cantor	[Basefreq: =0.25]
70	1	Jukes-Cantor	[Basefreq: =0.25]
71	1	Jukes-Cantor	[Basefreq: =0.25]
72	1	Jukes-Cantor	[Basefreq: =0.25]
73	1	Jukes-Cantor	[Basefreq: =0.25]
74	1	Jukes-Cantor	[Basefreq: =0.25]
75	1	Jukes-Cantor	[Basefreq: =0.25]
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77	1	Jukes-Cantor	[Basefreq: =0.25]
78	1	Jukes-Cantor	[Basefreq: =0.25]
79	1	Jukes-Cantor	[Basefreq: =0.25]

80	1	Jukes-Cantor	[Basefreq: =0.25]
81	1	Jukes-Cantor	[Basefreq: =0.25]
82	1	Jukes-Cantor	[Basefreq: =0.25]
83	1	Jukes-Cantor	[Basefreq: =0.25]
84	1	Jukes-Cantor	[Basefreq: =0.25]
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86	1	Jukes-Cantor	[Basefreq: =0.25]
87	1	Jukes-Cantor	[Basefreq: =0.25]
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91	1	Jukes-Cantor	[Basefreq: =0.25]
92	1	Jukes-Cantor	[Basefreq: =0.25]
93	1	Jukes-Cantor	[Basefreq: =0.25]
94	1	Jukes-Cantor	[Basefreq: =0.25]
95	1	Jukes-Cantor	[Basefreq: =0.25]
96	1	Jukes-Cantor	[Basefreq: =0.25]
97	1	Jukes-Cantor	[Basefreq: =0.25]
98	1	Jukes-Cantor	[Basefreq: =0.25]
99	1	Jukes-Cantor	[Basefreq: =0.25]
100	1	Jukes-Cantor	[Basefreq: =0.25]

Sites per locus

Locus	Sites
1	10000
2	10000
3	10000
4	10000
5	10000
6	10000
7	10000
8	10000
9	10000
10	10000
11	10000
12	10000
13	10000
14	10000
15	10000
16	10000
17	10000
18	10000
19	10000
20	10000

21	10000
22	10000
23	10000
24	10000
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37	10000
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90	10000
91	10000
92	10000
93	10000
94	10000
95	10000
96	10000
97	10000
98	10000
99	10000
100	10000

Site rate variation and probabilities:

Locus	Sublocus	Region	type	Rate of change	Probability	Patch size
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1	1	1		1.000	1.000	1.000
2	1	1		1.000	1.000	1.000
3	1	1		1.000	1.000	1.000
4	1	1		1.000	1.000	1.000
5	1	1		1.000	1.000	1.000
6	1	1		1.000	1.000	1.000

7	1	1	1.000	1.000	1.000
8	1	1	1.000	1.000	1.000
9	1	1	1.000	1.000	1.000
10	1	1	1.000	1.000	1.000
11	1	1	1.000	1.000	1.000
12	1	1	1.000	1.000	1.000
13	1	1	1.000	1.000	1.000
14	1	1	1.000	1.000	1.000
15	1	1	1.000	1.000	1.000
16	1	1	1.000	1.000	1.000
17	1	1	1.000	1.000	1.000
18	1	1	1.000	1.000	1.000
19	1	1	1.000	1.000	1.000
20	1	1	1.000	1.000	1.000
21	1	1	1.000	1.000	1.000
22	1	1	1.000	1.000	1.000
23	1	1	1.000	1.000	1.000
24	1	1	1.000	1.000	1.000
25	1	1	1.000	1.000	1.000
26	1	1	1.000	1.000	1.000
27	1	1	1.000	1.000	1.000
28	1	1	1.000	1.000	1.000
29	1	1	1.000	1.000	1.000
30	1	1	1.000	1.000	1.000
31	1	1	1.000	1.000	1.000
32	1	1	1.000	1.000	1.000
33	1	1	1.000	1.000	1.000
34	1	1	1.000	1.000	1.000
35	1	1	1.000	1.000	1.000
36	1	1	1.000	1.000	1.000
37	1	1	1.000	1.000	1.000
38	1	1	1.000	1.000	1.000
39	1	1	1.000	1.000	1.000
40	1	1	1.000	1.000	1.000
41	1	1	1.000	1.000	1.000
42	1	1	1.000	1.000	1.000
43	1	1	1.000	1.000	1.000
44	1	1	1.000	1.000	1.000
45	1	1	1.000	1.000	1.000
46	1	1	1.000	1.000	1.000
47	1	1	1.000	1.000	1.000
48	1	1	1.000	1.000	1.000
49	1	1	1.000	1.000	1.000
50	1	1	1.000	1.000	1.000
51	1	1	1.000	1.000	1.000

52	1	1	1.000	1.000	1.000
53	1	1	1.000	1.000	1.000
54	1	1	1.000	1.000	1.000
55	1	1	1.000	1.000	1.000
56	1	1	1.000	1.000	1.000
57	1	1	1.000	1.000	1.000
58	1	1	1.000	1.000	1.000
59	1	1	1.000	1.000	1.000
60	1	1	1.000	1.000	1.000
61	1	1	1.000	1.000	1.000
62	1	1	1.000	1.000	1.000
63	1	1	1.000	1.000	1.000
64	1	1	1.000	1.000	1.000
65	1	1	1.000	1.000	1.000
66	1	1	1.000	1.000	1.000
67	1	1	1.000	1.000	1.000
68	1	1	1.000	1.000	1.000
69	1	1	1.000	1.000	1.000
70	1	1	1.000	1.000	1.000
71	1	1	1.000	1.000	1.000
72	1	1	1.000	1.000	1.000
73	1	1	1.000	1.000	1.000
74	1	1	1.000	1.000	1.000
75	1	1	1.000	1.000	1.000
76	1	1	1.000	1.000	1.000
77	1	1	1.000	1.000	1.000
78	1	1	1.000	1.000	1.000
79	1	1	1.000	1.000	1.000
80	1	1	1.000	1.000	1.000
81	1	1	1.000	1.000	1.000
82	1	1	1.000	1.000	1.000
83	1	1	1.000	1.000	1.000
84	1	1	1.000	1.000	1.000
85	1	1	1.000	1.000	1.000
86	1	1	1.000	1.000	1.000
87	1	1	1.000	1.000	1.000
88	1	1	1.000	1.000	1.000
89	1	1	1.000	1.000	1.000
90	1	1	1.000	1.000	1.000
91	1	1	1.000	1.000	1.000
92	1	1	1.000	1.000	1.000
93	1	1	1.000	1.000	1.000
94	1	1	1.000	1.000	1.000
95	1	1	1.000	1.000	1.000
96	1	1	1.000	1.000	1.000

97	1	1	1.000	1.000	1.000	
98	1	1	1.000	1.000	1.000	
99	1	1	1.000	1.000	1.000	
100	1	1	1.000	1.000	1.000	
Population			Locus		Gene copies	
1 Romanshorn_0			1		10	
			2		10	
			3		10	
			4		10	
			5		10	
			6		10	
			7		10	
			8		10	
			9		10	
			10		10	
			11		10	
			12		10	
			13		10	
			14		10	
			15		10	
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85	10

	86	10
	87	10
	88	10
	89	10
	90	10
	91	10
	92	10
	93	10
	94	10
	95	10
	96	10
	97	10
	98	10
	99	10
	100	10
Total of all populations	1	10
	2	10
	3	10
	4	10
	5	10
	6	10
	7	10
	8	10
	9	10
	10	10
	11	10
	12	10
	13	10
	14	10
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91	10
92	10
93	10
94	10
95	10
96	10
97	10
98	10
99	10
100	10

Bayesian Analysis: Posterior distribution table

Locus	Parameter	2.5%	25.0%	Mode	75.0%	97.5%	Median	Mean
1	Θ_1	0.03280	0.04527	0.04803	0.04967	0.05160	0.04550	0.08538
2	Θ_1	0.03293	0.04507	0.04783	0.04933	0.05167	0.04523	0.08461
3	Θ_1	0.03180	0.04393	0.04790	0.04987	0.05167	0.04510	0.08439
4	Θ_1	0.03120	0.04360	0.04783	0.04973	0.05160	0.04483	0.08290
5	Θ_1	0.03287	0.04387	0.04797	0.04987	0.05160	0.04503	0.08430
6	Θ_1	0.03247	0.04427	0.04797	0.04993	0.05167	0.04537	0.08579
7	Θ_1	0.03287	0.04007	0.04790	0.05067	0.05160	0.04530	0.08421
8	Θ_1	0.03140	0.04460	0.04797	0.04960	0.05160	0.04477	0.08188
9	Θ_1	0.03080	0.04393	0.04777	0.04967	0.05187	0.04517	0.08601
10	Θ_1	0.03147	0.04400	0.04783	0.04980	0.05160	0.04517	0.08254
11	Θ_1	0.03120	0.04307	0.04783	0.04960	0.05153	0.04430	0.08194
12	Θ_1	0.03313	0.04447	0.04797	0.04993	0.05167	0.04557	0.08530
13	Θ_1	0.03207	0.04387	0.04790	0.04980	0.05160	0.04503	0.08389
14	Θ_1	0.03233	0.04400	0.04783	0.04973	0.05153	0.04517	0.08427
15	Θ_1	0.03407	0.04507	0.04797	0.04973	0.05160	0.04563	0.08536
16	Θ_1	0.03287	0.04400	0.04797	0.04993	0.05167	0.04510	0.08421
17	Θ_1	0.03267	0.04500	0.04790	0.04960	0.05173	0.04523	0.08524
18	Θ_1	0.02947	0.04067	0.04777	0.05013	0.05147	0.04383	0.07799

19	Θ_1	0.03007	0.04293	0.04777	0.04980	0.05153	0.04410	0.07874
20	Θ_1	0.03247	0.04387	0.04777	0.04960	0.05160	0.04517	0.08294
21	Θ_1	0.03153	0.04373	0.04790	0.04980	0.05167	0.04490	0.08385
22	Θ_1	0.03260	0.04400	0.04790	0.04967	0.05173	0.04523	0.08453
23	Θ_1	0.03120	0.04347	0.04777	0.04973	0.05153	0.04463	0.08136
24	Θ_1	0.03233	0.04367	0.04783	0.04953	0.05153	0.04497	0.08424
25	Θ_1	0.03160	0.04387	0.04783	0.04980	0.05153	0.04497	0.08334
26	Θ_1	0.03260	0.04367	0.04777	0.04967	0.05160	0.04490	0.08419
27	Θ_1	0.03227	0.04380	0.04797	0.04980	0.05160	0.04503	0.08375
28	Θ_1	0.03287	0.04393	0.04777	0.04973	0.05167	0.04517	0.08290
29	Θ_1	0.03180	0.04347	0.04777	0.04953	0.05147	0.04470	0.08265
30	Θ_1	0.03133	0.04420	0.04797	0.04967	0.05160	0.04437	0.08201
31	Θ_1	0.03260	0.04393	0.04777	0.04967	0.05160	0.04510	0.08340
32	Θ_1	0.03060	0.04320	0.04777	0.04973	0.05153	0.04443	0.07977
33	Θ_1	0.03213	0.04413	0.04777	0.04973	0.05160	0.04510	0.08444
34	Θ_1	0.03347	0.04527	0.04803	0.04980	0.05160	0.04550	0.08568
35	Θ_1	0.02867	0.04260	0.04770	0.04967	0.05147	0.04383	0.07736
36	Θ_1	0.03340	0.04420	0.04790	0.04973	0.05173	0.04543	0.08509
37	Θ_1	0.03247	0.04427	0.04797	0.05000	0.05160	0.04537	0.08369
38	Θ_1	0.03313	0.04413	0.04783	0.04980	0.05160	0.04530	0.08382
39	Θ_1	0.03293	0.04487	0.04790	0.04953	0.05160	0.04523	0.08414
40	Θ_1	0.03367	0.04440	0.04790	0.04973	0.05167	0.04557	0.08644
41	Θ_1	0.03240	0.04380	0.04777	0.04960	0.05153	0.04503	0.08417

Locus	Parameter	2.5%	25.0%	Mode	75.0%	97.5%	Median	Mean
42	Θ_1	0.03173	0.04380	0.04777	0.04980	0.05153	0.04497	0.08347
43	Θ_1	0.03287	0.04420	0.04803	0.04987	0.05173	0.04530	0.08484
44	Θ_1	0.03327	0.04407	0.04783	0.04973	0.05153	0.04510	0.08473
45	Θ_1	0.03093	0.04360	0.04783	0.04987	0.05160	0.04477	0.08276
46	Θ_1	0.03413	0.04433	0.04790	0.04973	0.05160	0.04557	0.08499
47	Θ_1	0.03367	0.04427	0.04783	0.04987	0.05153	0.04537	0.08486
48	Θ_1	0.03140	0.04353	0.04790	0.04987	0.05153	0.04470	0.08178
49	Θ_1	0.03120	0.04333	0.04777	0.04973	0.05153	0.04450	0.08146
50	Θ_1	0.03233	0.04387	0.04790	0.04980	0.05167	0.04503	0.08397
51	Θ_1	0.03193	0.04373	0.04777	0.04960	0.05167	0.04497	0.08309
52	Θ_1	0.03440	0.04500	0.04803	0.04980	0.05167	0.04550	0.08649
53	Θ_1	0.03193	0.04453	0.04783	0.04940	0.05160	0.04483	0.08180
54	Θ_1	0.03087	0.04360	0.04783	0.04980	0.05160	0.04477	0.08243
55	Θ_1	0.03260	0.04420	0.04790	0.04993	0.05173	0.04530	0.08459
56	Θ_1	0.03240	0.04373	0.04783	0.04960	0.05153	0.04503	0.08420
57	Θ_1	0.03120	0.04347	0.04783	0.04987	0.05160	0.04463	0.08336
58	Θ_1	0.03193	0.04393	0.04797	0.04993	0.05167	0.04503	0.08466
59	Θ_1	0.03073	0.04320	0.04770	0.04967	0.05160	0.04443	0.08096
60	Θ_1	0.03013	0.04293	0.04777	0.04967	0.05153	0.04417	0.08007
61	Θ_1	0.03293	0.04493	0.04783	0.04947	0.05160	0.04510	0.08418

62	Θ_1	0.03200	0.04393	0.04797	0.05000	0.05160	0.04503	0.08353
63	Θ_1	0.03220	0.04507	0.04783	0.04933	0.05167	0.04530	0.08495
64	Θ_1	0.03420	0.04433	0.04783	0.04960	0.05153	0.04557	0.08635
65	Θ_1	0.03293	0.04513	0.04797	0.04947	0.05160	0.04530	0.08332
66	Θ_1	0.03273	0.04433	0.04790	0.04973	0.05167	0.04557	0.08487
67	Θ_1	0.03420	0.04533	0.04783	0.04933	0.05167	0.04550	0.08581
68	Θ_1	0.03153	0.04360	0.04790	0.04987	0.05160	0.04483	0.08362
69	Θ_1	0.03200	0.04467	0.04777	0.04933	0.05153	0.04483	0.08212
70	Θ_1	0.03120	0.04360	0.04783	0.04987	0.05153	0.04477	0.08158
71	Θ_1	0.03413	0.04433	0.04797	0.04980	0.05153	0.04550	0.08666
72	Θ_1	0.03333	0.04567	0.04790	0.04940	0.05167	0.04583	0.08603
73	Θ_1	0.03067	0.04313	0.04783	0.04973	0.05153	0.04430	0.07943
74	Θ_1	0.03413	0.04453	0.04803	0.04993	0.05160	0.04563	0.08632
75	Θ_1	0.03507	0.04500	0.04797	0.04987	0.05160	0.04610	0.08864
76	Θ_1	0.03320	0.04413	0.04797	0.04993	0.05173	0.04523	0.08510
77	Θ_1	0.03247	0.04400	0.04783	0.04960	0.05173	0.04523	0.08372
78	Θ_1	0.03360	0.04440	0.04797	0.04993	0.05167	0.04557	0.08570
79	Θ_1	0.03073	0.04373	0.04790	0.04973	0.05167	0.04490	0.08295
80	Θ_1	0.03120	0.04320	0.04783	0.04973	0.05153	0.04443	0.07990
81	Θ_1	0.03173	0.04353	0.04790	0.04987	0.05167	0.04470	0.08231
82	Θ_1	0.03140	0.04340	0.04783	0.04973	0.05153	0.04463	0.08254
83	Θ_1	0.03200	0.04353	0.04777	0.04967	0.05167	0.04477	0.08237
84	Θ_1	0.03287	0.04400	0.04790	0.04987	0.05147	0.04510	0.08596

Locus	Parameter	2.5%	25.0%	Mode	75.0%	97.5%	Median	Mean
85	Θ_1	0.03407	0.04420	0.04803	0.04967	0.05167	0.04550	0.08675
86	Θ_1	0.03180	0.04420	0.04797	0.04987	0.05153	0.04463	0.08127
87	Θ_1	0.03213	0.04393	0.04783	0.04987	0.05160	0.04510	0.08377
88	Θ_1	0.03213	0.04393	0.04790	0.04980	0.05153	0.04503	0.08391
89	Θ_1	0.03253	0.04487	0.04783	0.04953	0.05160	0.04537	0.08359
90	Θ_1	0.03100	0.04353	0.04790	0.04980	0.05167	0.04470	0.08245
91	Θ_1	0.03287	0.04420	0.04790	0.04973	0.05167	0.04543	0.08482
92	Θ_1	0.03207	0.04440	0.04777	0.04973	0.05160	0.04557	0.08612
93	Θ_1	0.03307	0.04380	0.04777	0.04947	0.05160	0.04510	0.08526
94	Θ_1	0.03100	0.04340	0.04790	0.04967	0.05160	0.04463	0.08206
95	Θ_1	0.03380	0.04420	0.04783	0.04967	0.05153	0.04543	0.08580
96	Θ_1	0.03160	0.04367	0.04783	0.04973	0.05160	0.04490	0.08324
97	Θ_1	0.03307	0.04420	0.04783	0.04973	0.05153	0.04537	0.08573
98	Θ_1	0.03453	0.04440	0.04790	0.04973	0.05173	0.04557	0.08642
99	Θ_1	0.03160	0.04353	0.04790	0.04973	0.05153	0.04477	0.08263
100	Θ_1	0.03160	0.04480	0.04783	0.04953	0.05160	0.04497	0.08274
All	Θ_1	0.00847	0.01280	0.01503	0.01647	0.01933	0.01443	0.09972

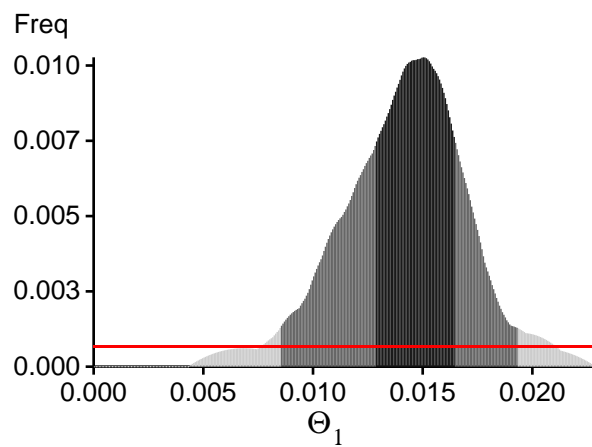
Citation suggestions:

Beerli P., 2006. Comparison of Bayesian and maximum-likelihood inference of population genetic parameters.
 Bioinformatics 22:341-345

Beerli P., 2007. Estimation of the population scaled mutation rate from microsatellite data,
 Genetics, 177:1967-1968.

Beerli P., 2009. How to use MIGRATE or why are Markov chain Monte Carlo programs difficult to use?
 In Population Genetics for Animal Conservation, G. Bertorelle, M. W. Bruford, H. C. Hauffe, A. Rizzoli,
 and C. Vernesi, eds., vol. 17 of Conservation Biology, Cambridge University Press, Cambridge UK, pp. 42-79.

Bayesian Analysis: Posterior distribution over all loci



Log-Probability of the data given the model (marginal likelihood)

Use this value for Bayes factor calculations:

$BF = \text{Exp}[\ln(\text{Prob}(D \mid \text{thisModel}) - \ln(\text{Prob}(D \mid \text{otherModel}))]$

or as $LBF = 2 (\ln(\text{Prob}(D \mid \text{thisModel}) - \ln(\text{Prob}(D \mid \text{otherModel})))$

shows the support for thisModel]

Locus	TI(1a)	BTI(1b)	SS(2)	HS(3)
1	-17766.01	-16375.65	-16232.88	-16302.97
2	-14326.88	-14047.58	-14083.69	-14161.80
3	-14139.87	-13957.48	-14002.59	-14084.68
4	-14258.11	-14022.10	-14064.04	-14143.66
5	-14105.12	-13939.55	-13990.12	-14072.66
6	-14536.40	-14205.89	-14233.47	-14310.26
7	-14396.57	-14160.39	-14206.77	-14283.44
8	-13970.58	-13817.64	-13867.19	-13951.55
9	-15582.58	-14882.61	-14851.58	-14923.67
10	-14383.33	-14111.86	-14144.59	-14227.62
11	-17454.20	-16905.31	-16853.20	-16981.57
12	-14762.35	-14385.91	-14409.53	-14484.57
13	-14516.95	-14243.47	-14283.06	-14361.21
14	-18867.23	-16892.36	-16637.62	-16713.84
15	-14425.29	-14130.74	-14170.15	-14242.65
16	-14186.53	-13972.13	-14019.40	-14096.46
17	-14304.42	-14083.57	-14132.49	-14207.13
18	-13897.57	-13753.55	-13798.28	-13889.70
19	-13912.13	-13767.09	-13812.93	-13902.45
20	-14005.82	-13848.22	-13899.21	-13982.78
21	-14570.90	-14179.82	-14193.18	-14272.85
22	-14414.12	-14164.33	-14210.33	-14285.13
23	-13986.83	-13820.95	-13869.87	-13954.09
24	-15029.06	-14710.31	-14742.11	-14824.54
25	-14061.63	-13901.23	-13952.90	-14034.68
26	-15035.73	-14559.46	-14564.28	-14641.06
27	-17508.87	-15991.65	-15812.97	-15889.91
28	-14771.97	-14315.79	-14317.45	-14398.30
29	-14007.02	-13853.16	-13904.19	-13987.74

30	-14004.81	-13854.12	-13901.79	-13988.60
31	-14892.56	-14326.62	-14308.22	-14388.71
32	-13933.16	-13777.41	-13824.23	-13912.04
33	-19477.99	-17700.53	-17492.44	-17568.71
34	-17700.42	-17070.95	-17002.43	-17119.28
35	-13893.77	-13753.16	-13800.16	-13890.31
36	-14306.79	-14055.15	-14092.72	-14172.44
37	-14152.89	-13929.22	-13972.29	-14052.41
38	-14925.17	-14379.03	-14362.39	-14445.75
39	-14648.69	-14299.97	-14326.07	-14403.67
40	-14857.75	-14508.94	-14537.84	-14611.51
41	-14988.55	-14756.64	-14765.42	-14871.56
42	-14055.72	-13883.45	-13936.73	-14015.30
43	-14992.81	-14622.40	-14648.71	-14724.12
44	-17116.21	-16018.39	-15923.00	-15997.04
45	-14196.37	-14031.53	-14069.78	-14161.77
46	-14655.10	-14252.26	-14268.01	-14348.43
47	-14219.49	-13997.83	-14044.52	-14121.74
48	-14254.76	-13999.37	-14034.35	-14118.04
49	-14018.52	-13838.54	-13884.95	-13969.43
50	-14175.65	-13947.92	-13991.05	-14069.11
51	-14090.52	-13897.58	-13942.90	-14027.00
52	-39165.38	-24901.56	-22378.80	-22448.79
53	-14031.80	-13878.03	-13929.01	-14014.27
54	-16706.14	-15714.81	-15630.38	-15712.86
55	-14206.00	-14026.10	-14074.59	-14156.51
56	-14139.87	-13964.10	-14009.75	-14092.02
57	-15498.82	-14935.45	-14929.21	-15005.17
58	-14251.94	-14049.97	-14100.04	-14179.53
59	-14153.80	-13977.92	-14026.27	-14112.29
60	-13967.85	-13805.78	-13851.87	-13939.25
61	-15186.13	-14870.73	-14893.43	-14979.52
62	-14301.11	-14123.69	-14164.55	-14250.88
63	-15964.99	-15100.58	-15037.24	-15113.09
64	-14663.29	-14264.25	-14280.42	-14355.97
65	-14379.58	-14115.44	-14152.61	-14233.16
66	-14552.29	-14325.00	-14370.13	-14453.04
67	-15181.58	-14526.74	-14495.88	-14571.86
68	-14453.95	-14240.38	-14278.34	-14361.37
69	-14195.14	-13945.17	-13979.53	-14063.68
70	-14129.00	-13924.32	-13967.22	-14051.20
71	-14727.93	-14413.62	-14454.23	-14522.46
72	-15920.46	-15257.42	-15225.23	-15303.00
73	-13950.41	-13804.82	-13854.16	-13942.99
74	-18755.70	-16302.67	-15952.92	-16024.08

75	-21094.08	-17686.55	-17179.34	-17241.38
76	-14212.23	-14020.17	-14071.34	-14148.57
77	-14318.71	-14035.91	-14069.88	-14149.66
78	-14780.67	-14372.49	-14384.11	-14461.77
79	-17319.89	-16444.36	-16390.25	-16471.77
80	-13958.70	-13805.43	-13852.27	-13940.41
81	-14925.84	-14475.31	-14480.18	-14562.27
82	-14017.25	-13857.04	-13908.16	-13991.28
83	-14196.09	-13975.79	-14018.99	-14100.30
84	-14922.23	-14527.79	-14555.88	-14623.68
85	-14980.31	-14676.17	-14718.72	-14790.05
86	-14044.47	-13861.85	-13908.33	-13992.75
87	-14623.36	-14347.88	-14385.91	-14464.47
88	-14703.08	-14297.81	-14312.89	-14390.86
89	-14268.16	-14028.87	-14071.37	-14150.39
90	-14056.03	-13875.78	-13924.65	-14006.77
91	-14785.31	-14309.91	-14312.98	-14390.54
92	-20259.64	-18925.12	-18769.83	-18855.05
93	-14133.01	-13963.87	-14017.81	-14097.63
94	-14069.13	-13904.93	-13947.71	-14035.43
95	-14422.22	-14122.17	-14157.92	-14231.71
96	-14062.76	-13884.50	-13930.95	-14014.47
97	-16147.95	-15445.95	-15425.19	-15492.39
98	-16878.87	-15620.92	-15496.37	-15563.91
99	-14041.96	-13877.00	-13925.20	-14010.34
100	-19464.56	-17164.11	-16845.17	-16928.28
All	-1523771.34	-1463736.95	-1461347.13	-1469442.93
(1a) TI: Thermodynamic integration: log(Prob(D Model)): Good approximation with many temperatures				
(1b) BTI: Bezier-approximated Thermodynamic integration: when using few temperatures USE THIS!				
(2) SS: Steppingstone Sampling (Xie et al 2011)				
(3) HS: Harmonic mean approximation: Overestimates the marginal likelihood, poor variance				
[Scaling factor = 140.089826]				
Citation suggestions:				
Beerli P. and M. Palczewski, 2010. Unified framework to evaluate panmixia and migration direction among multiple sampling locations, Genetics, 185: 313-326.				
Palczewski M. and P. Beerli, 2014. Population model comparison using multi-locus datasets. In M.-H. Chen, L. Kuo, and P. O. Lewis, editors, Bayesian Phylogenetics: Methods, Algorithms, and Applications, pages 187-200. CRC Press, 2014.				
Xie W., P. O. Lewis, Y. Fan, L. Kuo, and M.-H. Chen. 2011. Improving marginal likelihood estimation for Bayesian phylogenetic model selection. Systematic Biology, 60(2):150â 160, 2011.				

Acceptance ratios for all parameters and the genealogies

Parameter	Accepted changes	Ratio
Θ_1	376693264/400008858	0.94171
Genealogies	309774173/1599991142	0.19361

MCMC-Autocorrelation and Effective MCMC Sample Size

Parameter	Autocorrelation	Effective Sampe Size
Θ_1	0.49676	3371001.18
Genealogies	0.29109	5903061.29

Average temperatures during the run

Chain	Temperatures
-------	--------------

1	0.00000
2	0.00000
3	0.00000
4	0.00000

Adaptive heating often fails, if the average temperatures are very close together try to rerun using static heating! If you want to compare models using marginal likelihoods then you **MUST** use static heating

Potential Problems

This section reports potential problems with your run, but such reporting is often not very accurate. With many parameters in a multilocus analysis, it is very common that some parameters for some loci will not be very informative, triggering suggestions (for example to increase the prior range) that are not sensible. This suggestion tool will improve with time, therefore do not blindly follow its suggestions. If some parameters are flagged, inspect the tables carefully and judge whether an action is required. For example, if you run a Bayesian inference with sequence data, for macroscopic species there is rarely the need to increase the prior for Theta beyond 0.1; but if you use microsatellites it is rather common that your prior distribution for Theta should have a range from 0.0 to 100 or more. With many populations (>3) it is also very common that some migration routes are estimated poorly because the data contains little or no information for that route. Increasing the range will not help in such situations, reducing number of parameters may help in such situations.

No warning was recorded during the run