

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 21:48:59 2017

Program finished at Sun Aug 13 23:19:32 2017 [Runtime:0000:01:30:33]



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)

3797782802

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.1.0

Haplotyping is turned on:

NO

Output file:

outfile_1.0_0.8

Posterior distribution raw histogram file:

bayesfile

Raw data from the MCMC run:

bayesallfile_1.0_0.8

Print data:

No

Print genealogies [only some for some data type]:

None

Data summary

Data file: infile.1.0
 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]
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9	1	Jukes-Cantor	[Basefreq: =0.25]
10	1	Jukes-Cantor	[Basefreq: =0.25]
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12	1	Jukes-Cantor	[Basefreq: =0.25]
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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
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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	
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	87	10
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	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
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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	0.01753	0.02640	0.03183	0.03847	0.04960	0.03330	0.04112
2	Θ_1	0.01653	0.01940	0.02970	0.04327	0.04880	0.03143	0.03758
3	Θ_1	0.02447	0.03847	0.04590	0.04853	0.05087	0.03970	0.05566
4	Θ_1	0.02167	0.03247	0.03770	0.04480	0.05027	0.03670	0.04721
5	Θ_1	0.02253	0.02427	0.04290	0.05033	0.05060	0.03817	0.05197
6	Θ_1	0.01320	0.01680	0.02517	0.03700	0.04660	0.02823	0.03323
7	Θ_1	0.02313	0.03473	0.04190	0.04860	0.05073	0.03863	0.05235
8	Θ_1	0.02040	0.03033	0.03743	0.04227	0.05007	0.03563	0.04539
9	Θ_1	0.00780	0.01200	0.01783	0.02633	0.04013	0.02137	0.02402
10	Θ_1	0.01480	0.02080	0.02523	0.03133	0.04360	0.02857	0.03329
11	Θ_1	0.02307	0.03893	0.04583	0.04827	0.05080	0.03910	0.05509
12	Θ_1	0.02533	0.03933	0.04750	0.04907	0.05113	0.04090	0.06067
13	Θ_1	0.01627	0.02427	0.02943	0.03700	0.04920	0.03190	0.03914
14	Θ_1	0.01673	0.02533	0.03070	0.03807	0.04960	0.03270	0.03992
15	Θ_1	0.02640	0.04013	0.04750	0.04900	0.05113	0.04123	0.06068
16	Θ_1	0.02153	0.03453	0.03890	0.04540	0.05040	0.03717	0.04868
17	Θ_1	0.01620	0.02067	0.02677	0.03673	0.04727	0.03023	0.03556
18	Θ_1	0.02187	0.03173	0.04183	0.04913	0.05080	0.03837	0.05278

19	Θ_1	0.00893	0.01567	0.02257	0.03227	0.04993	0.02590	0.02966
20	Θ_1	0.02473	0.03987	0.04750	0.04867	0.05100	0.04037	0.05841
21	Θ_1	0.01907	0.02867	0.03490	0.04333	0.05007	0.03503	0.04460
22	Θ_1	0.00707	0.01193	0.01803	0.02613	0.04153	0.02117	0.02382
23	Θ_1	0.02147	0.03287	0.04030	0.04573	0.05047	0.03703	0.04865
24	Θ_1	0.01660	0.02573	0.02997	0.03727	0.04967	0.03263	0.03991
25	Θ_1	0.02107	0.03413	0.03903	0.04747	0.05073	0.03750	0.04939
26	Θ_1	0.01667	0.02140	0.02743	0.03607	0.04747	0.03063	0.03625
27	Θ_1	0.01240	0.01673	0.02277	0.03093	0.04127	0.02657	0.03136
28	Θ_1	0.02500	0.03920	0.04657	0.04867	0.05100	0.04030	0.05725
29	Θ_1	0.02087	0.03120	0.03937	0.04453	0.05033	0.03643	0.04746
30	Θ_1	0.00787	0.01660	0.01910	0.02187	0.04500	0.02250	0.02539
31	Θ_1	0.01987	0.02667	0.03550	0.04673	0.05007	0.03517	0.04460
32	Θ_1	0.02240	0.03640	0.04063	0.04780	0.05060	0.03810	0.05158
33	Θ_1	0.02213	0.03647	0.04270	0.04807	0.05073	0.03830	0.05266
34	Θ_1	0.02780	0.04213	0.04757	0.04900	0.05127	0.04237	0.06468
35	Θ_1	0.01507	0.02000	0.02810	0.03693	0.04780	0.02990	0.03570
36	Θ_1	0.02067	0.03227	0.03930	0.04540	0.05040	0.03657	0.04832
37	Θ_1	0.02307	0.03793	0.04603	0.04840	0.05087	0.03903	0.05491
38	Θ_1	0.02627	0.04147	0.04757	0.04900	0.05120	0.04163	0.06331
39	Θ_1	0.02260	0.03627	0.04283	0.04820	0.05073	0.03830	0.05184
40	Θ_1	0.01713	0.02373	0.02983	0.03733	0.04887	0.03183	0.03829
41	Θ_1	0.01513	0.02060	0.02843	0.04147	0.04920	0.03130	0.03970

Locus	Parameter	2.5%	25.0%	Mode	75.0%	97.5%	Median	Mean
42	Θ_1	0.02600	0.03993	0.04750	0.04887	0.05107	0.04083	0.05876
43	Θ_1	0.01473	0.02107	0.02583	0.03140	0.04473	0.02883	0.03376
44	Θ_1	0.02413	0.03920	0.04690	0.04840	0.05080	0.03937	0.05434
45	Θ_1	0.01987	0.02773	0.03603	0.04520	0.05000	0.03530	0.04494
46	Θ_1	0.01533	0.02513	0.02823	0.03253	0.04887	0.03090	0.03728
47	Θ_1	0.01847	0.03007	0.03283	0.03587	0.04973	0.03383	0.04205
48	Θ_1	0.02387	0.03720	0.04503	0.04827	0.05080	0.03903	0.05372
49	Θ_1	0.00700	0.01267	0.01677	0.02193	0.03753	0.02003	0.02251
50	Θ_1	0.01953	0.03360	0.03723	0.04247	0.05047	0.03603	0.04700
51	Θ_1	0.01827	0.02740	0.03190	0.03947	0.04973	0.03383	0.04247
52	Θ_1	0.02600	0.03953	0.04717	0.04867	0.05093	0.04063	0.05755
53	Θ_1	0.02060	0.03060	0.03703	0.04780	0.05033	0.03643	0.04797
54	Θ_1	0.01420	0.02227	0.02917	0.03547	0.04927	0.03070	0.03738
55	Θ_1	0.01987	0.03020	0.03757	0.04320	0.05013	0.03563	0.04574
56	Θ_1	0.02327	0.03667	0.04197	0.04820	0.05073	0.03863	0.05235
57	Θ_1	0.01167	0.02093	0.02330	0.02540	0.04653	0.02703	0.03151
58	Θ_1	0.01120	0.01773	0.02430	0.02987	0.04720	0.02650	0.03058
59	Θ_1	0.01120	0.01660	0.02290	0.03127	0.04580	0.02683	0.03216
60	Θ_1	0.02573	0.03980	0.04750	0.04913	0.05113	0.04130	0.06277
61	Θ_1	0.02353	0.03827	0.04570	0.04860	0.05093	0.03950	0.05592

62	Θ_1	0.02373	0.02373	0.04723	0.05087	0.05087	0.03937	0.05522
63	Θ_1	0.00747	0.01400	0.01597	0.01793	0.03233	0.01903	0.02127
64	Θ_1	0.02200	0.03513	0.04097	0.04733	0.05053	0.03770	0.05051
65	Θ_1	0.03007	0.04280	0.04763	0.04913	0.05133	0.04337	0.06864
66	Θ_1	0.02460	0.03960	0.04750	0.04847	0.05087	0.03977	0.05580
67	Θ_1	0.02120	0.03420	0.03870	0.04573	0.05047	0.03703	0.04925
68	Θ_1	0.02113	0.03180	0.03843	0.04533	0.05033	0.03663	0.04774
69	Θ_1	0.02327	0.03840	0.04750	0.04873	0.05100	0.03963	0.05714
70	Θ_1	0.02940	0.04200	0.04770	0.04947	0.05140	0.04330	0.06811
71	Θ_1	0.02033	0.02993	0.03397	0.04087	0.04993	0.03530	0.04458
72	Θ_1	0.02427	0.03807	0.04750	0.04880	0.05087	0.03970	0.05595
73	Θ_1	0.01320	0.01647	0.02563	0.03940	0.04773	0.02870	0.03439
74	Θ_1	0.02520	0.04060	0.04757	0.04893	0.05107	0.04077	0.06106
75	Θ_1	0.02193	0.03473	0.03977	0.04480	0.05040	0.03723	0.04870
76	Θ_1	0.01533	0.02320	0.02950	0.03807	0.04940	0.03163	0.03948
77	Θ_1	0.02233	0.03673	0.04037	0.04780	0.05067	0.03817	0.05198
78	Θ_1	0.01660	0.02300	0.02857	0.03440	0.04787	0.03077	0.03655
79	Θ_1	0.01607	0.02733	0.03023	0.03567	0.04960	0.03237	0.03983
80	Θ_1	0.01873	0.02180	0.03843	0.04980	0.05040	0.03577	0.04781
81	Θ_1	0.02593	0.04087	0.04750	0.04887	0.05107	0.04110	0.06087
82	Θ_1	0.01867	0.02840	0.03683	0.04200	0.05000	0.03470	0.04437
83	Θ_1	0.02447	0.03793	0.04750	0.04867	0.05087	0.03970	0.05533
84	Θ_1	0.02393	0.03893	0.04517	0.04807	0.05073	0.03917	0.05348

Locus	Parameter	2.5%	25.0%	Mode	75.0%	97.5%	Median	Mean
85	Θ_1	0.02200	0.03420	0.03937	0.04620	0.05040	0.03730	0.04922
86	Θ_1	0.01813	0.03047	0.03490	0.04080	0.05013	0.03470	0.04446
87	Θ_1	0.01980	0.03393	0.03897	0.04780	0.05073	0.03703	0.05005
88	Θ_1	0.02433	0.03780	0.04563	0.04847	0.05087	0.03950	0.05475
89	Θ_1	0.01400	0.01860	0.02410	0.03127	0.04147	0.02737	0.03137
90	Θ_1	0.00927	0.01787	0.02083	0.02453	0.04633	0.02430	0.02749
91	Θ_1	0.02207	0.03473	0.03997	0.04560	0.05053	0.03750	0.04924
92	Θ_1	0.02040	0.03120	0.03630	0.04400	0.05027	0.03610	0.04705
93	Θ_1	0.01680	0.02607	0.03350	0.04093	0.04980	0.03337	0.04238
94	Θ_1	0.02373	0.03833	0.04497	0.04800	0.05067	0.03890	0.05309
95	Θ_1	0.02427	0.03793	0.04597	0.04820	0.05073	0.03910	0.05338
96	Θ_1	0.02807	0.04113	0.04763	0.04933	0.05133	0.04250	0.06489
97	Θ_1	0.02087	0.03433	0.04130	0.04713	0.05047	0.03703	0.04942
98	Θ_1	0.02773	0.04093	0.04757	0.04927	0.05127	0.04237	0.06463
99	Θ_1	0.02660	0.04007	0.04757	0.04913	0.05113	0.04150	0.06047
100	Θ_1	0.02233	0.03640	0.04290	0.04780	0.05067	0.03817	0.05197
All	Θ_1	0.03413	0.03660	0.03790	0.03933	0.04140	0.03797	0.03787

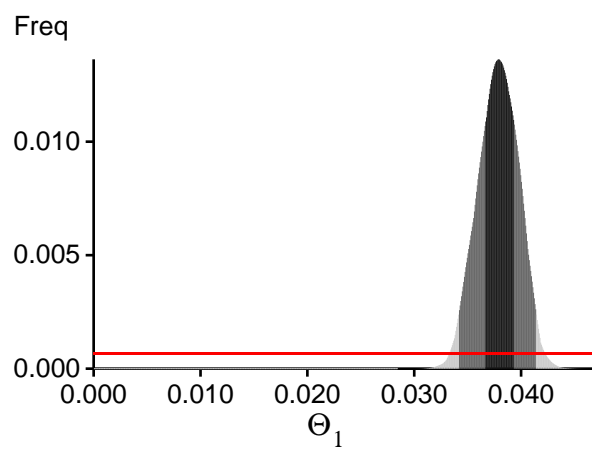
Citation suggestions:

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	-15656.79	-15175.36	-15215.91	-15263.03
2	-16111.99	-15575.50	-15608.27	-15657.42
3	-17168.56	-16465.55	-16483.21	-16526.74
4	-16816.26	-16026.99	-16020.13	-16065.74
5	-15969.04	-15548.78	-15606.50	-15652.67
6	-15260.72	-14890.45	-14945.60	-14996.47
7	-17910.47	-16652.42	-16563.73	-16607.68
8	-17108.68	-16562.03	-16607.52	-16654.48
9	-15064.68	-14726.16	-14780.96	-14837.98
10	-15350.95	-14966.05	-15019.29	-15069.45
11	-17676.57	-16829.61	-16822.12	-16868.03
12	-17073.87	-16563.82	-16618.96	-16662.15
13	-16710.64	-16005.79	-16011.90	-16060.43
14	-16110.90	-15528.12	-15552.35	-15600.13
15	-17160.99	-16448.68	-16463.62	-16508.05
16	-16099.04	-15618.94	-15666.01	-15712.54
17	-16114.22	-15519.87	-15540.33	-15589.37
18	-17800.90	-16726.31	-16673.08	-16719.03
19	-15240.47	-14837.11	-14883.40	-14936.01
20	-16226.70	-15739.78	-15790.16	-15832.87
21	-15535.55	-15163.55	-15223.72	-15275.01
22	-14886.01	-14595.09	-14657.25	-14713.16
23	-15725.39	-15368.77	-15436.98	-15483.25
24	-16355.01	-15584.85	-15572.77	-15623.26
25	-17040.02	-16174.89	-16154.40	-16200.47
26	-15632.67	-15310.92	-15382.44	-15430.43
27	-15324.71	-14956.88	-15012.87	-15063.70
28	-16649.28	-16159.56	-16214.87	-16257.67
29	-16208.33	-15672.98	-15710.42	-15757.32

30	-15271.85	-14860.45	-14903.58	-14959.21
31	-17685.19	-16716.70	-16681.29	-16729.59
32	-16391.00	-15783.63	-15809.43	-15854.33
33	-16091.72	-15619.93	-15670.29	-15715.12
34	-17770.53	-17172.83	-17220.94	-17261.20
35	-15428.78	-15054.08	-15109.77	-15161.66
36	-15897.59	-15425.90	-15473.08	-15518.28
37	-16397.04	-15870.88	-15914.36	-15957.97
38	-16763.20	-16192.18	-16233.85	-16274.41
39	-16015.35	-15522.63	-15567.28	-15612.80
40	-15916.43	-15409.52	-15445.65	-15496.34
41	-15675.70	-15291.61	-15351.18	-15399.83
42	-16769.58	-16145.40	-16174.10	-16216.64
43	-15776.64	-15250.20	-15279.58	-15330.25
44	-16426.43	-15919.57	-15967.51	-16011.75
45	-16576.10	-15879.19	-15887.45	-15934.01
46	-16114.95	-15541.04	-15565.77	-15616.05
47	-17539.75	-16610.55	-16581.75	-16629.22
48	-16043.43	-15568.27	-15618.19	-15661.84
49	-15037.00	-14748.09	-14810.33	-14866.75
50	-16563.68	-15962.59	-15989.58	-16036.85
51	-17238.91	-16595.75	-16622.09	-16669.48
52	-18110.15	-17101.46	-17067.59	-17110.65
53	-17077.13	-16194.58	-16171.94	-16217.69
54	-15403.76	-15035.33	-15093.26	-15142.73
55	-16049.99	-15631.86	-15690.72	-15736.61
56	-16523.00	-15863.89	-15880.31	-15928.22
57	-15097.12	-14760.68	-14819.52	-14871.82
58	-14964.07	-14691.89	-14762.21	-14814.77
59	-15315.34	-14957.26	-15014.86	-15066.63
60	-17691.17	-16802.60	-16789.55	-16831.45
61	-17156.12	-16587.17	-16630.76	-16677.01
62	-16228.57	-15831.91	-15899.87	-15944.03
63	-14948.16	-14630.30	-14687.68	-14743.61
64	-18703.38	-17060.68	-16900.76	-16947.27
65	-17748.35	-16904.49	-16903.31	-16943.29
66	-17084.35	-16269.07	-16262.15	-16305.81
67	-16833.67	-16100.08	-16104.67	-16150.46
68	-17025.93	-16315.76	-16327.20	-16373.34
69	-16841.69	-16191.88	-16215.80	-16259.09
70	-17681.70	-16883.90	-16891.13	-16930.60
71	-17043.04	-16047.03	-15998.76	-16045.67
72	-17227.87	-16436.19	-16435.67	-16479.65
73	-15468.58	-15069.25	-15121.04	-15171.33
74	-16716.02	-16156.38	-16198.30	-16242.26

75	-17555.71	-16526.52	-16479.62	-16526.28
76	-16791.64	-16140.58	-16157.95	-16206.86
77	-15927.65	-15474.37	-15526.36	-15570.73
78	-16346.12	-15728.02	-15746.41	-15796.35
79	-15832.45	-15377.56	-15422.38	-15472.19
80	-15723.63	-15386.88	-15459.38	-15506.14
81	-17931.54	-16898.83	-16858.56	-16900.17
82	-15648.62	-15229.20	-15282.13	-15331.18
83	-18892.02	-17404.10	-17280.70	-17325.58
84	-16763.25	-16269.30	-16323.87	-16368.16
85	-16106.36	-15659.54	-15714.72	-15762.38
86	-16267.48	-15703.21	-15732.33	-15781.71
87	-16921.82	-16117.72	-16108.39	-16154.65
88	-18550.67	-17186.70	-17084.67	-17130.02
89	-15752.33	-15261.42	-15296.63	-15347.62
90	-14942.82	-14678.52	-14750.26	-14802.21
91	-16356.74	-15946.82	-16013.15	-16057.69
92	-15711.88	-15274.73	-15325.82	-15372.16
93	-15239.11	-14934.82	-15005.55	-15055.08
94	-16812.38	-16157.90	-16180.22	-16223.83
95	-16435.94	-15827.69	-15854.62	-15899.35
96	-18757.36	-17477.14	-17397.48	-17438.24
97	-16130.68	-15723.63	-15785.77	-15832.25
98	-17395.15	-16645.16	-16658.16	-16700.08
99	-17700.31	-17042.11	-17075.97	-17118.88
100	-15757.80	-15384.35	-15450.77	-15495.48
All	-1646519.36	-1585464.74	-1587903.20	-1592595.86
(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 = 51.536369]				
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	374424743/400012506	0.93603
Genealogies	68839725/1599987494	0.04303

MCMC-Autocorrelation and Effective MCMC Sample Size

Parameter	Autocorrelation	Effective Sampe Size
Θ_1	0.62214	2342569.25
Genealogies	0.26848	5780847.79

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