

# Supplementary Information

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## Parameters used

Priors sets 1, 2, and 3 were used for testing the effects of strict bottlenecks and germline timing on number of cells and number of cell types Prior set 4 was used for testing for a phylogenetic correlation between early germline segregation and the presence of a strict bottleneck

### Prior set 1

```
p1=list(R = list(V = 1, nu=0.002), G = list(G1=list(V = 1, nu = 0.002)))
```

### Prior set 2

```
p2=list(R=list(V=1, nu=1), G=list(G1=list(V=1, nu=1, alpha.mu=0, alpha.var=1000)))
```

### Prior set 3

```
p3=list(R=list(V=1, nu=2), G=list(G1=list(V=1, nu=2, alpha.mu=0, alpha.var=1000)))
```

### Prior set 4

```
p4=list(B=list(mu=c(0,0), V=diag(c(1+pi^2/3,1+pi^2/3))), R = list(V = diag(2),nu=1, fix=1), G = list(G1=list(V = diag(2), nu = 1, alpha.mu = c(0,0), alpha.V = diag(c(1000,1000)))))
```

## MCMCglmm parameters

- iterations:
  - $8 \times 10^6$  for testing the effects of strict bottlenecks and germline timing on number of cells and number of cell types
  - $1.6 \times 10^7$  for testing for a phylogenetic correlation between early germline segregation and the presence of a strict bottleneck
- burnin:  $10^6$
- thinning: 1000
- number of chains: 6

## Including data from congeners

### Model 1: *Number of Cells ~ Presence of Strict Bottleneck*

- Table S1.1.1: estimates of fixed effects for model 1, with prior set 1
- Table S1.1.2: comparison of fixed effects for model 1, with prior set 1
- Table S1.2.1: estimates of fixed effects for model 1, with prior set 2
- Table S1.2.2: comparison of fixed effects for model 1, with prior set 2
- Table S1.3.1: estimates of fixed effects for model 1, with prior set 3
- Table S1.3.2: comparison of fixed effects for model 1, with prior set 3

Table 1: Table S1.1.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
Fission0	12.29 (-0.56, 24.17)	0.056
Fission1	7.23 (-1.56, 23.14)	0.095

Table 2: Table S1.1.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
Fission0 vs Fission1	1.7 (-0.63, 3.53)	0.15

Model 1, prior set p1

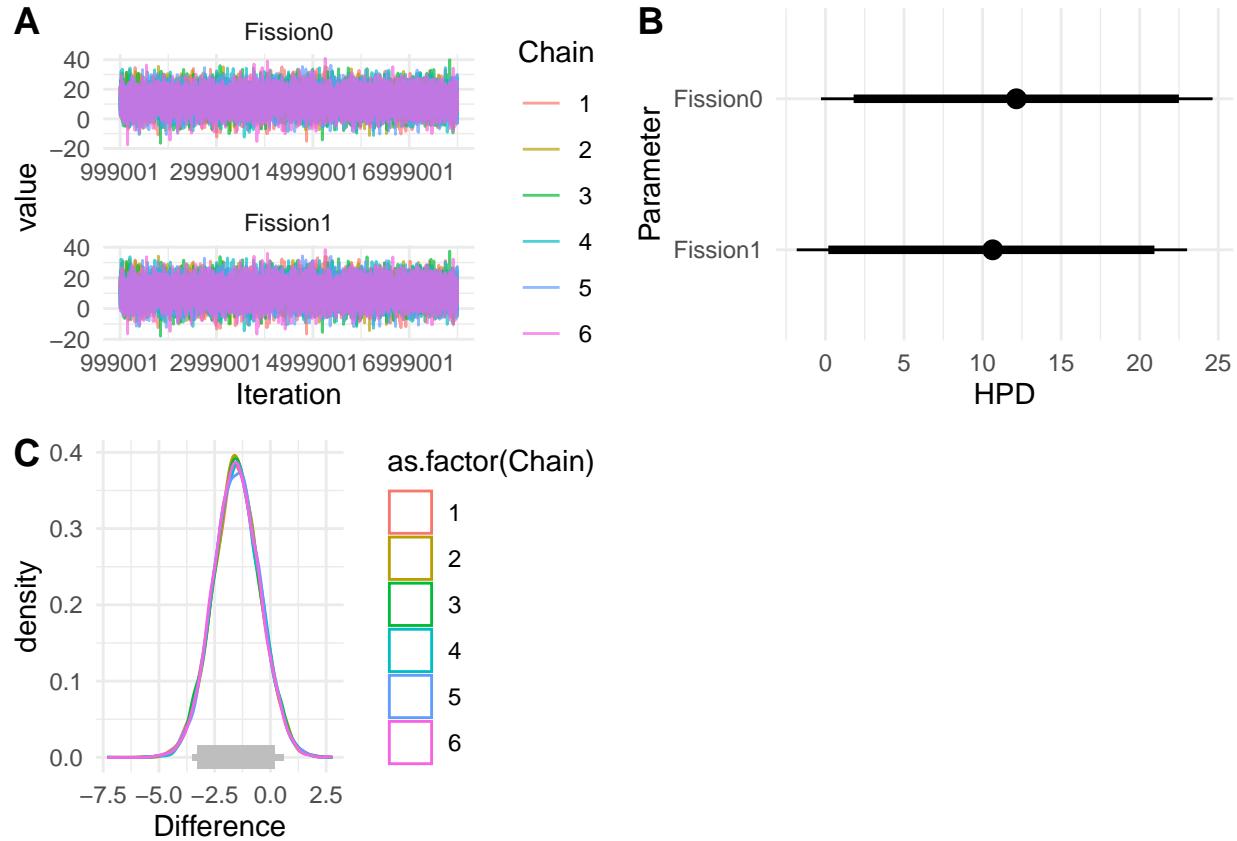


Table 3: Table S1.2.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
Fission0	11.74 (-0.68, 24.4)	0.057
Fission1	10 (-1.8, 23.14)	0.087

Table 4: Table S1.2.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
Fission0 vs Fission1	1.41 (-0.51, 3.51)	0.141

Model 1, prior set p2

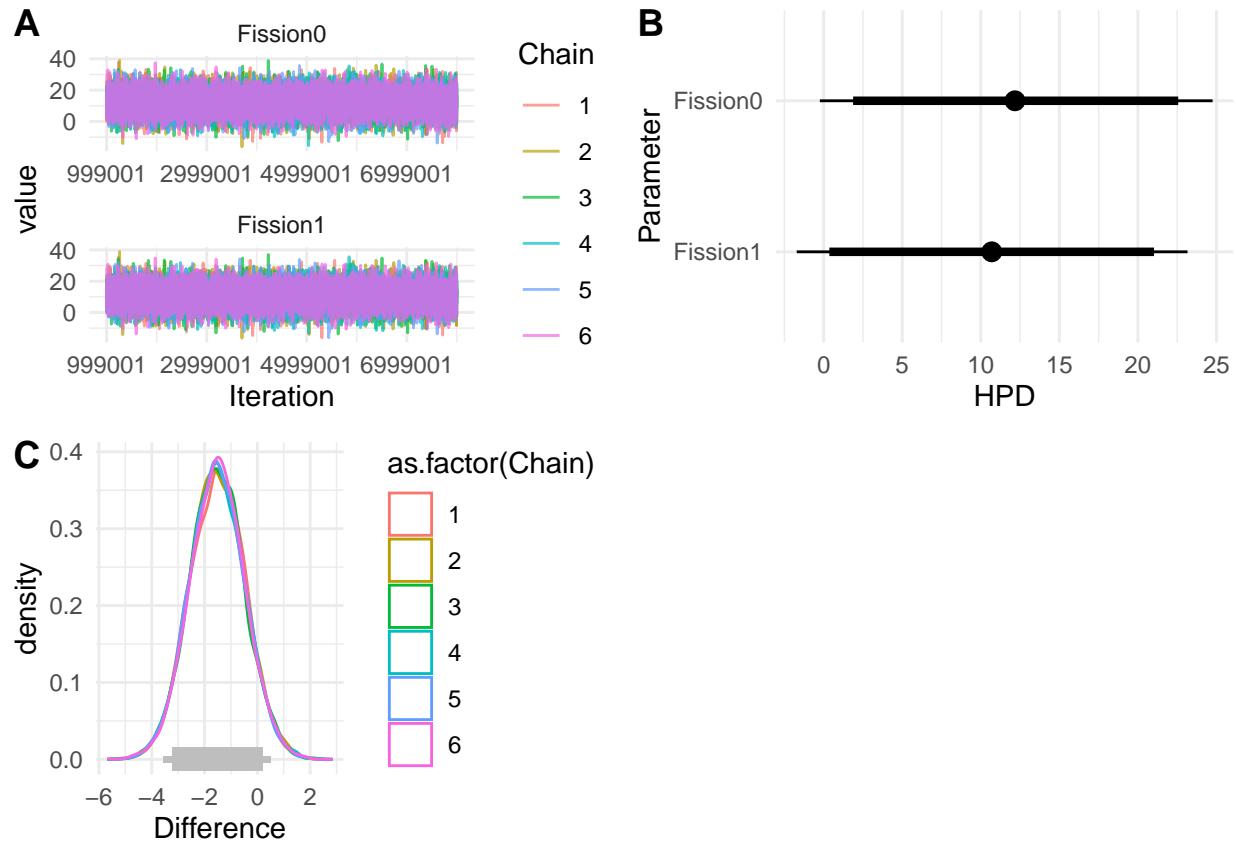


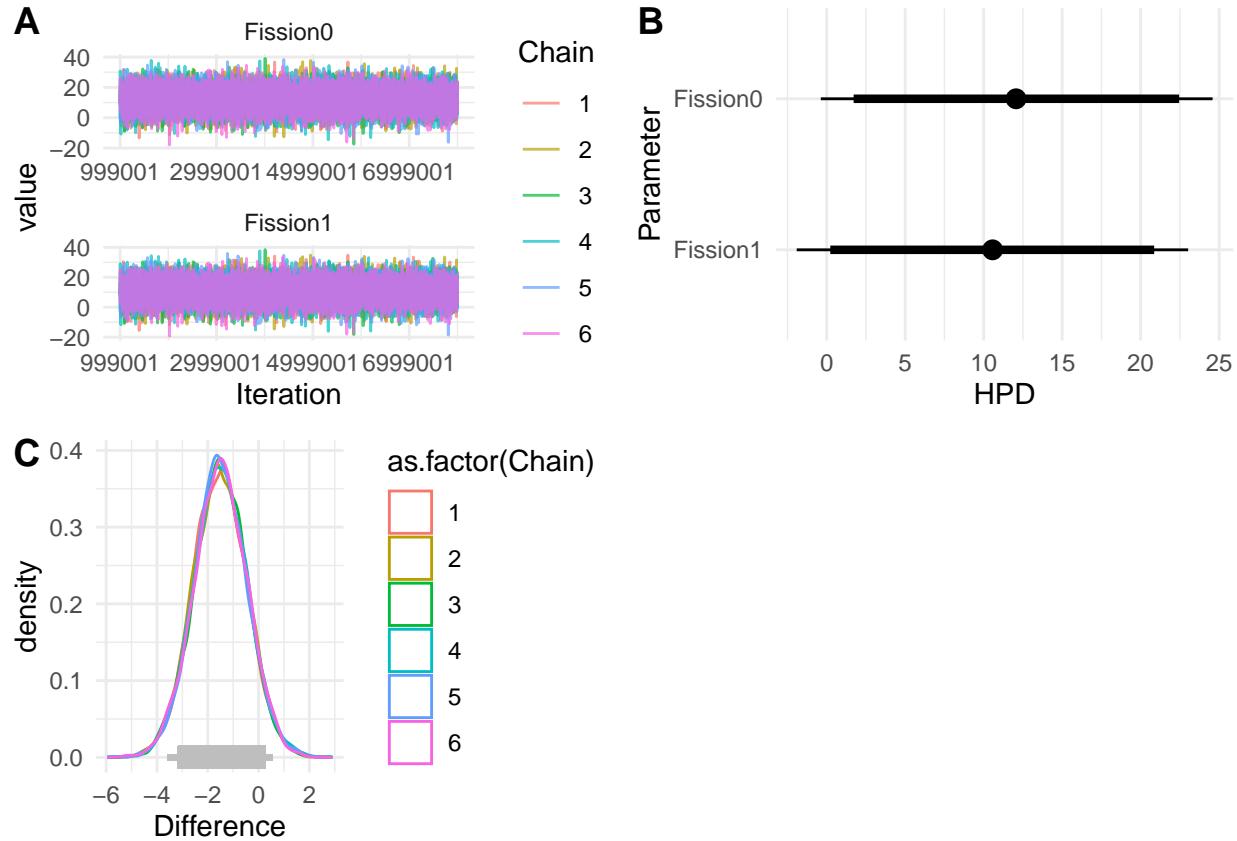
Table 5: Table S1.3.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
Fission0	12.03 (-0.06, 24.7)	0.057
Fission1	10.15 (-2.06, 22.74)	0.093

Table 6: Table S1.3.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
Fission0 vs Fission1	1.38 (-0.67, 3.43)	0.141

Model 1, prior set p3



**Model 2:  $Number\ of\ Cell\ Types \sim Presence\ of\ Strict\ Bottleneck + \log(Number\ of\ Cells)$**

- Table S2.1.1: estimates of fixed effects for model 2, with prior set 1
- Table S2.1.2: comparison of fixed effects for model 2, with prior set 1
- Table S2.2.1: estimates of fixed effects for model 2, with prior set 2
- Table S2.2.2: comparison of fixed effects for model 2, with prior set 2
- Table S2.3.1: estimates of fixed effects for model 2, with prior set 3
- Table S2.3.2: comparison of fixed effects for model 2, with prior set 3

Table 7: Table S2.1.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
Fission0	1.97 (0.88, 2.82)	0
Fission1	1.77 (0.9, 2.81)	0
scale(log(Number))	0.59 (0.49, 0.72)	0

Table 8: Table S2.1.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
Fission0 vs Fission1	-0.04 (-0.21, 0.15)	0.704
Fission0 vs scale(log(Number))	1.24 (0.27, 2.22)	0.017
Fission1 vs scale(log(Number))	1.37 (0.31, 2.24)	0.013

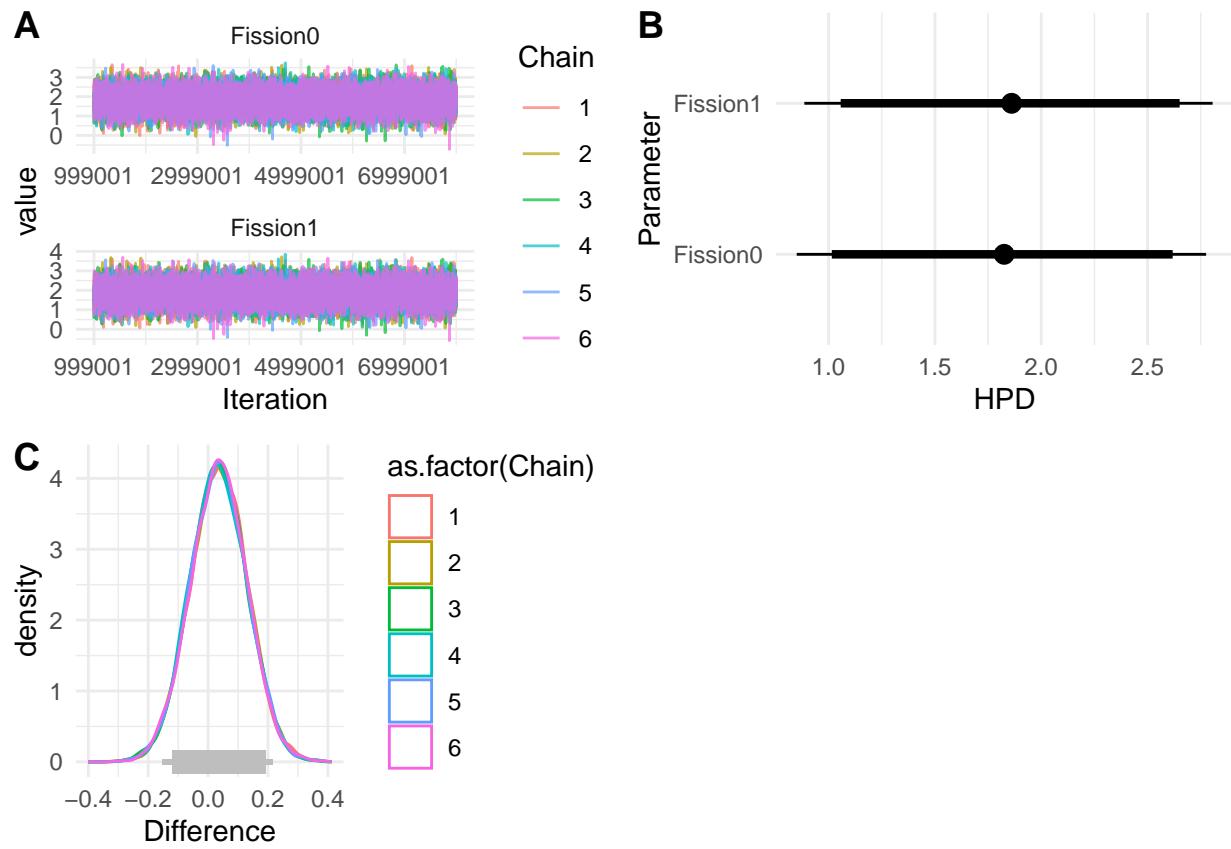


Table 9: Table S2.2.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
Fission0	1.88 (0.94, 2.7)	0
Fission1	2.02 (0.98, 2.74)	0
scale(log(Number))	0.65 (0.52, 0.78)	0

Table 10: Table S2.2.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
Fission0 vs Fission1	-0.04 (-0.25, 0.17)	0.707
Fission0 vs scale(log(Number))	1.27 (0.31, 2.09)	0.012
Fission1 vs scale(log(Number))	1.36 (0.36, 2.12)	0.007

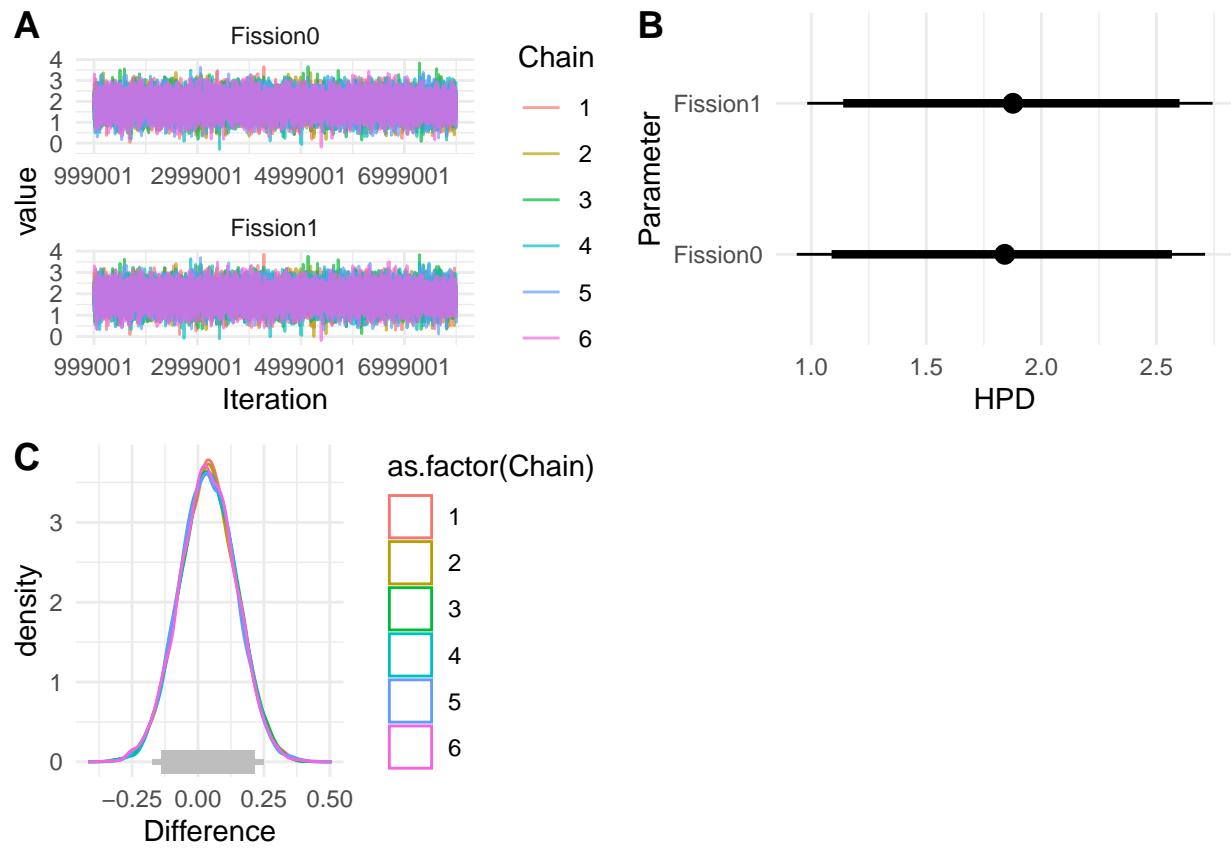
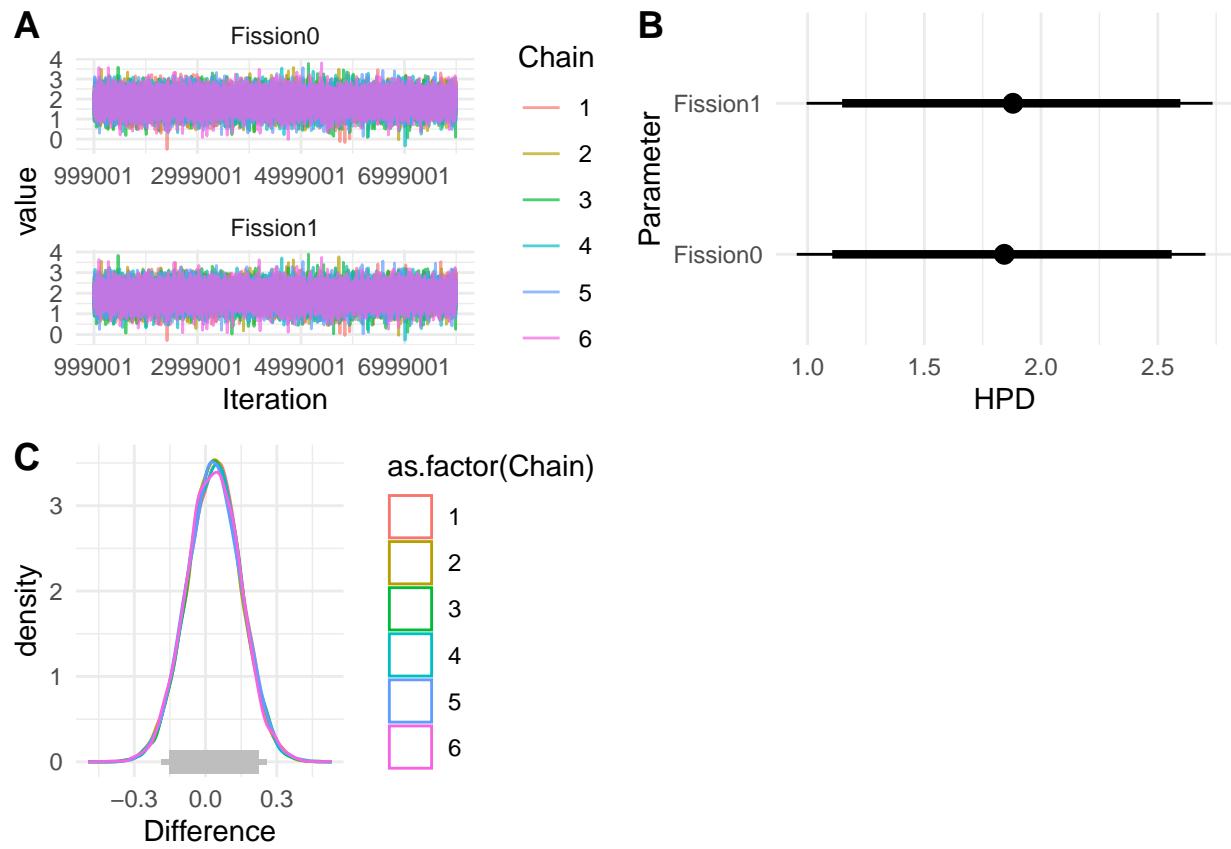


Table 11: Table S2.3.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
Fission0	1.81 (0.91, 2.68)	0.001
Fission1	1.9 (1, 2.78)	0.001
scale(log(Number))	0.64 (0.51, 0.79)	0.000

Table 12: Table S2.3.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
Fission0 vs Fission1	-0.03 (-0.25, 0.19)	0.734
Fission0 vs scale(log(Number))	1.15 (0.31, 2.11)	0.011
Fission1 vs scale(log(Number))	1.26 (0.32, 2.09)	0.006



### **Model 3: *Number of Cells ~ Timing of Germline Segregation***

- Table S3.1.1: estimates of fixed effects for model 3, with prior set 1
- Table S3.1.2: comparison of fixed effects for model 3, with prior set 1
- Table S3.2.1: estimates of fixed effects for model 3, with prior set 2
- Table S3.2.2: comparison of fixed effects for model 3, with prior set 2
- Table S3.3.1: estimates of fixed effects for model 3, with prior set 3
- Table S3.3.2: comparison of fixed effects for model 3, with prior set 3

Table 13: Table S3.1.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
GermTimeSimpadult	13.53 (2.02, 23.82)	0.021
GermTimeSimpearly	14.61 (1.26, 24.37)	0.022
GermTimeSimpno_germline	7.56 (-3.92, 18.64)	0.188

Table 14: Table S3.1.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
GermTimeSimpadult vs GermTimeSimpearly	-1.3 (-4.82, 3.6)	0.752
GermTimeSimpadult vs GermTimeSimpno_germline	6.73 (1.42, 10.08)	0.012
GermTimeSimpearly vs GermTimeSimpno_germline	6.42 (0.45, 12.21)	0.044

Model 3, prior set p1

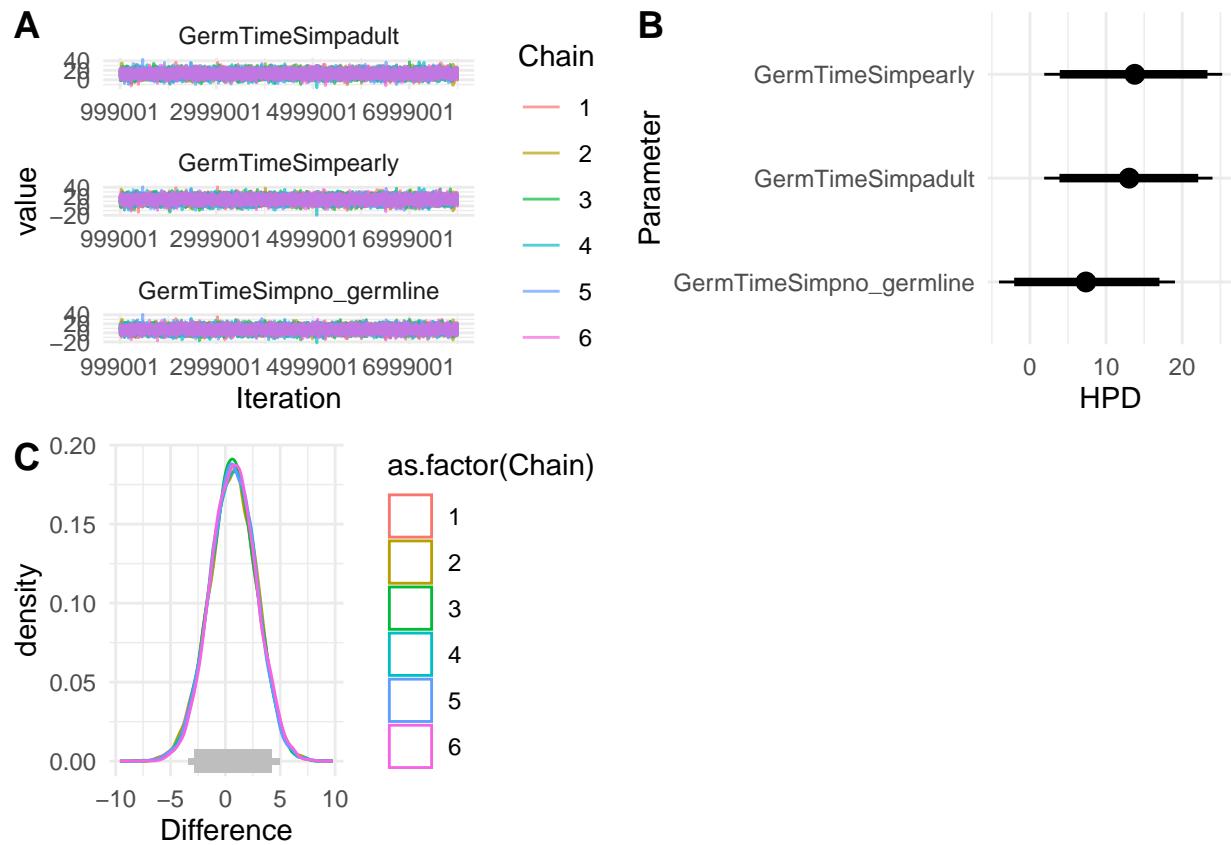


Table 15: Table S3.2.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
GermTimeSimpadult	12.33 (2.2, 23.57)	0.021
GermTimeSimpearly	13.83 (2.33, 25.35)	0.023
GermTimeSimpno_germline	8.09 (-3.58, 19)	0.197

Table 16: Table S3.2.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
GermTimeSimpadult vs GermTimeSimpearly	-0.61 (-5.1, 3.19)	0.713
GermTimeSimpadult vs GermTimeSimpno_germline	6.11 (1.47, 10.09)	0.014
GermTimeSimpearly vs GermTimeSimpno_germline	6.82 (0.34, 12.26)	0.035

Model 3, prior set p2

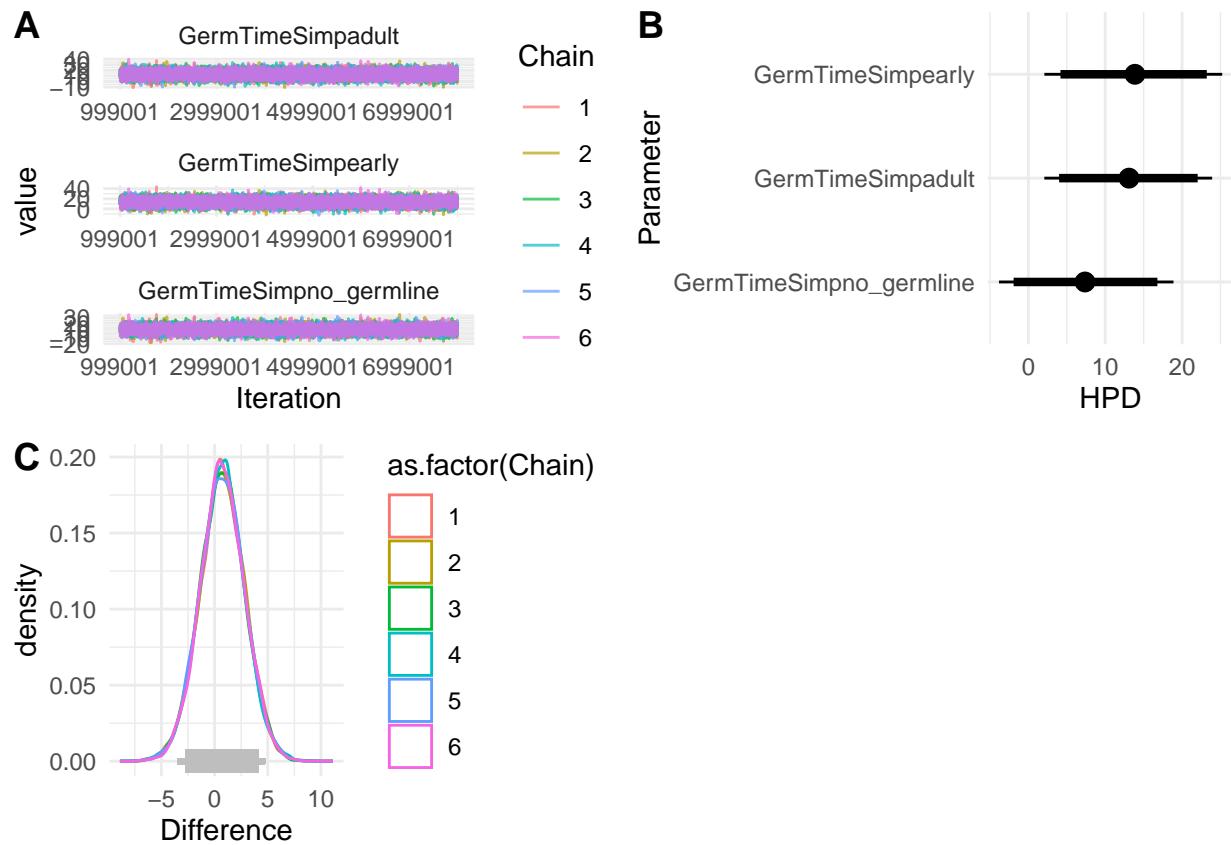


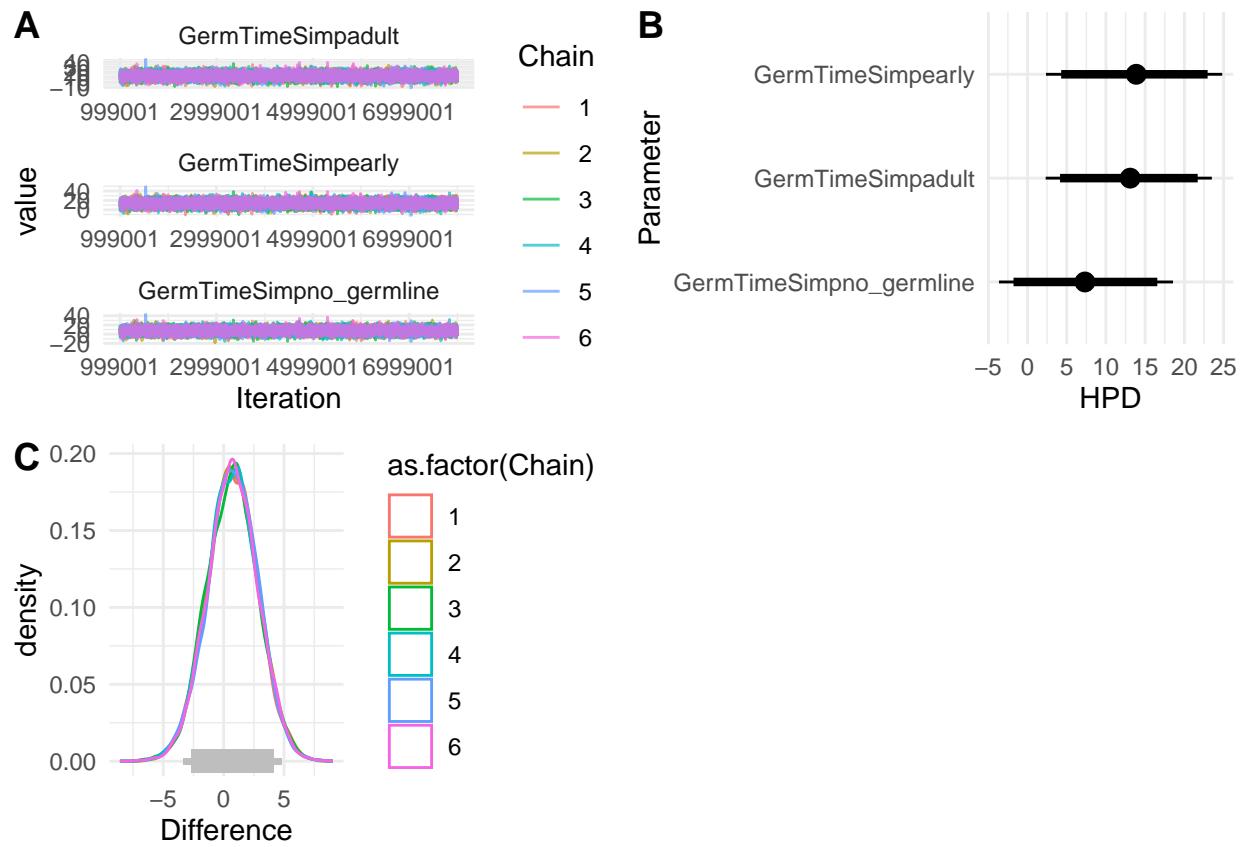
Table 17: Table S3.3.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
GermTimeSimpadult	12.81 (1.82, 23.49)	0.024
GermTimeSimpearly	13.25 (1.79, 24.9)	0.023
GermTimeSimpno_germline	8.98 (-3.38, 19.09)	0.188

Table 18: Table S3.3.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
GermTimeSimpadult vs GermTimeSimpearly	-0.56 (-4.75, 3.31)	0.716
GermTimeSimpadult vs GermTimeSimpno_germline	5.64 (1.21, 9.82)	0.011
GermTimeSimpearly vs GermTimeSimpno_germline	6.98 (0.52, 12.19)	0.037

Model 3, prior set p3



**Model 4:  $Number\ of\ Cell\ Types \sim Timing\ of\ Germline\ Segregation + \log(Number\ of\ Cells)$**

- Table S4.1.1: estimates of fixed effects for model 4, with prior set 1
- Table S4.1.2: comparison of fixed effects for model 4, with prior set 1
- Table S4.2.1: estimates of fixed effects for model 4, with prior set 2
- Table S4.2.2: comparison of fixed effects for model 4, with prior set 2
- Table S4.3.1: estimates of fixed effects for model 4, with prior set 3
- Table S4.3.2: comparison of fixed effects for model 4, with prior set 3

Table 19: Table S4.1.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
GermTimeSimpadult	2.11 (1.15, 2.82)	0.000
GermTimeSimpearly	2.47 (1.51, 3.31)	0.000
GermTimeSimpno_germline	1.47 (0.38, 2.4)	0.006
scale(log(Number))	0.58 (0.47, 0.7)	0.000

Table 20: Table S4.1.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
GermTimeSimpadult vs GermTimeSimpearly	-0.49 (-0.85, -0.12)	0.015
GermTimeSimpadult vs GermTimeSimpno_germline	0.61 (-0.11, 1.18)	0.094
GermTimeSimpadult vs scale(log(Number))	1.38 (0.53, 2.22)	0.002
GermTimeSimpearly vs GermTimeSimpno_germline	0.9 (0.25, 1.71)	0.008
GermTimeSimpearly vs scale(log(Number))	1.91 (0.91, 2.72)	0.000
GermTimeSimpno_germline vs scale(log(Number))	0.85 (-0.13, 1.86)	0.097

Model 4, prior set p1

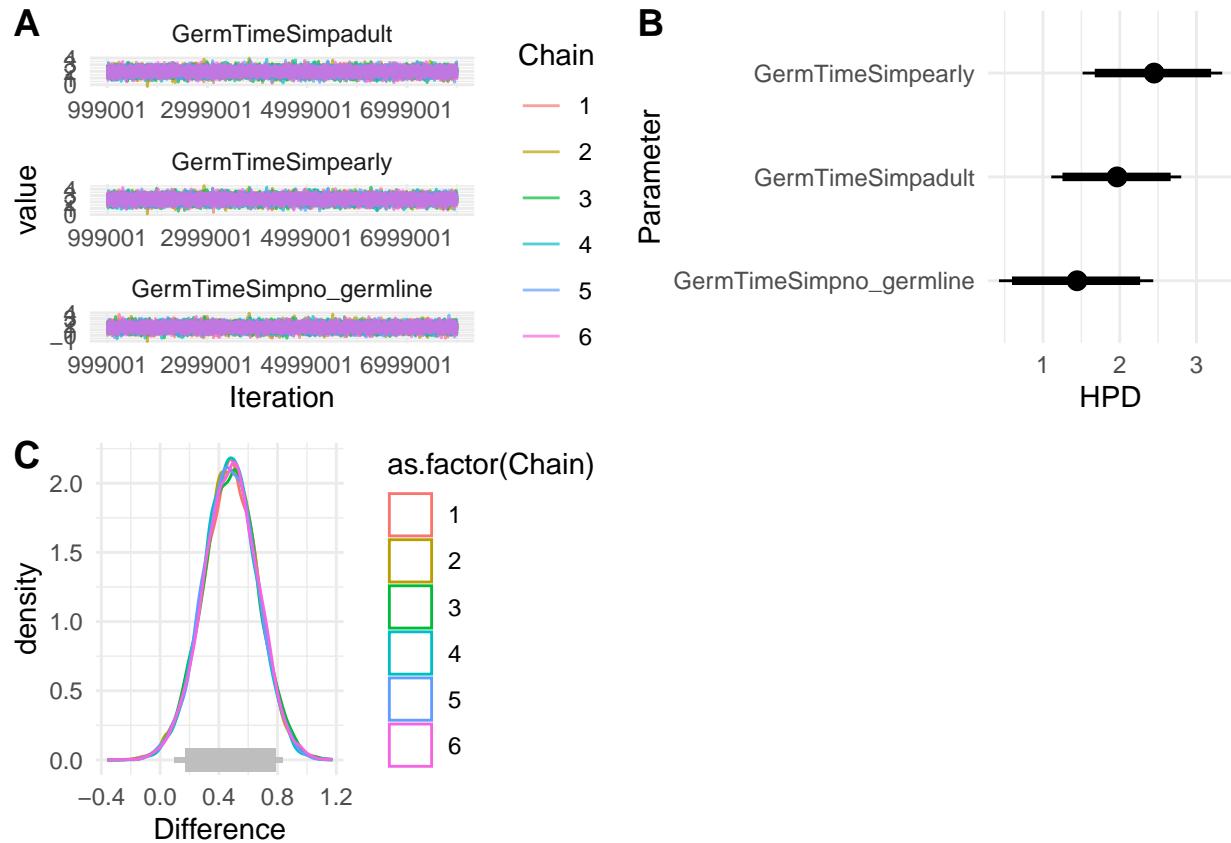


Table 21: Table S4.2.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
GermTimeSimpadult	1.87 (1.2, 2.8)	0.000
GermTimeSimpearly	2.44 (1.62, 3.3)	0.000
GermTimeSimpno_germline	1.58 (0.55, 2.47)	0.004
scale(log(Number))	0.6 (0.47, 0.74)	0.000

Table 22: Table S4.2.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
GermTimeSimpadult vs GermTimeSimpearly	-0.53 (-0.85, -0.09)	0.012
GermTimeSimpadult vs GermTimeSimpno_germline	0.65 (-0.13, 1.15)	0.104
GermTimeSimpadult vs scale(log(Number))	1.35 (0.6, 2.19)	0.001
GermTimeSimpearly vs GermTimeSimpno_germline	1.14 (0.32, 1.78)	0.006
GermTimeSimpearly vs scale(log(Number))	1.8 (1, 2.7)	0.000
GermTimeSimpno_germline vs scale(log(Number))	0.93 (-0.11, 1.78)	0.082

Model 4, prior set p2

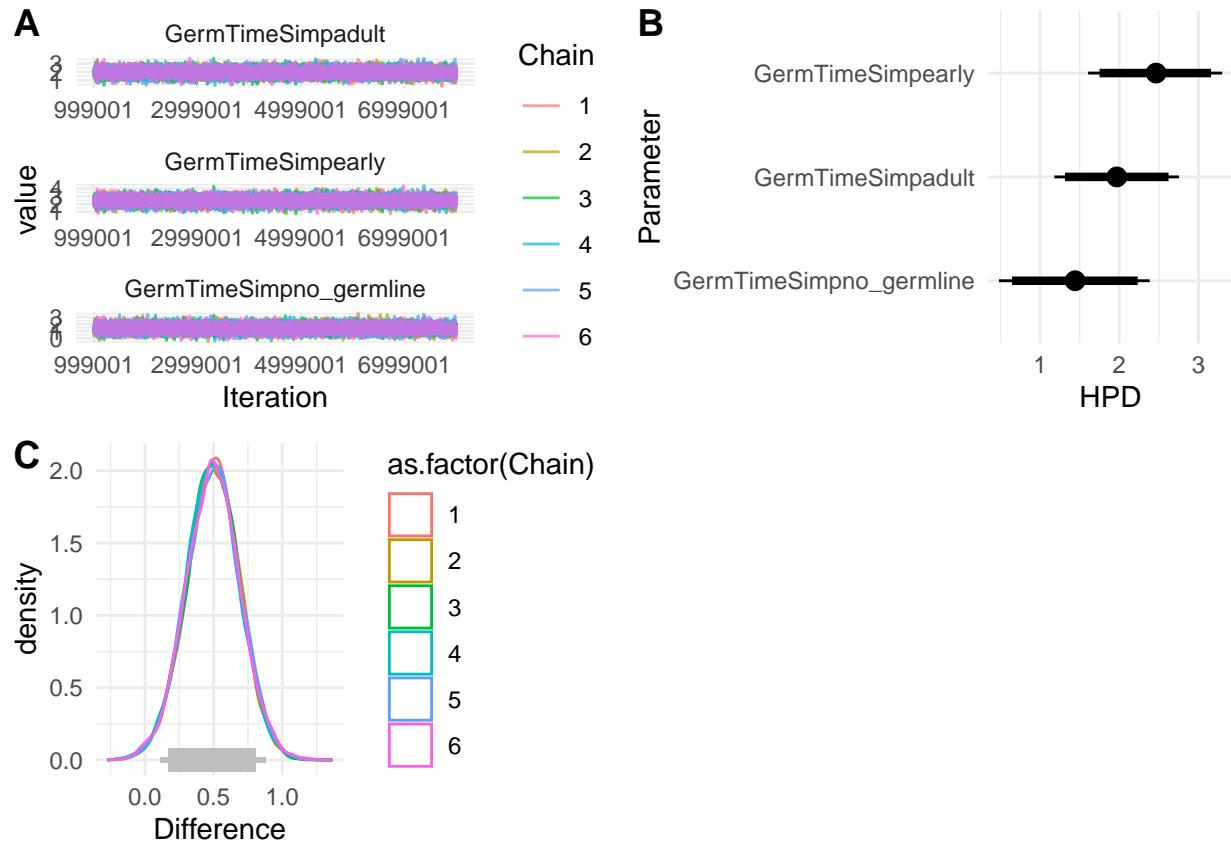


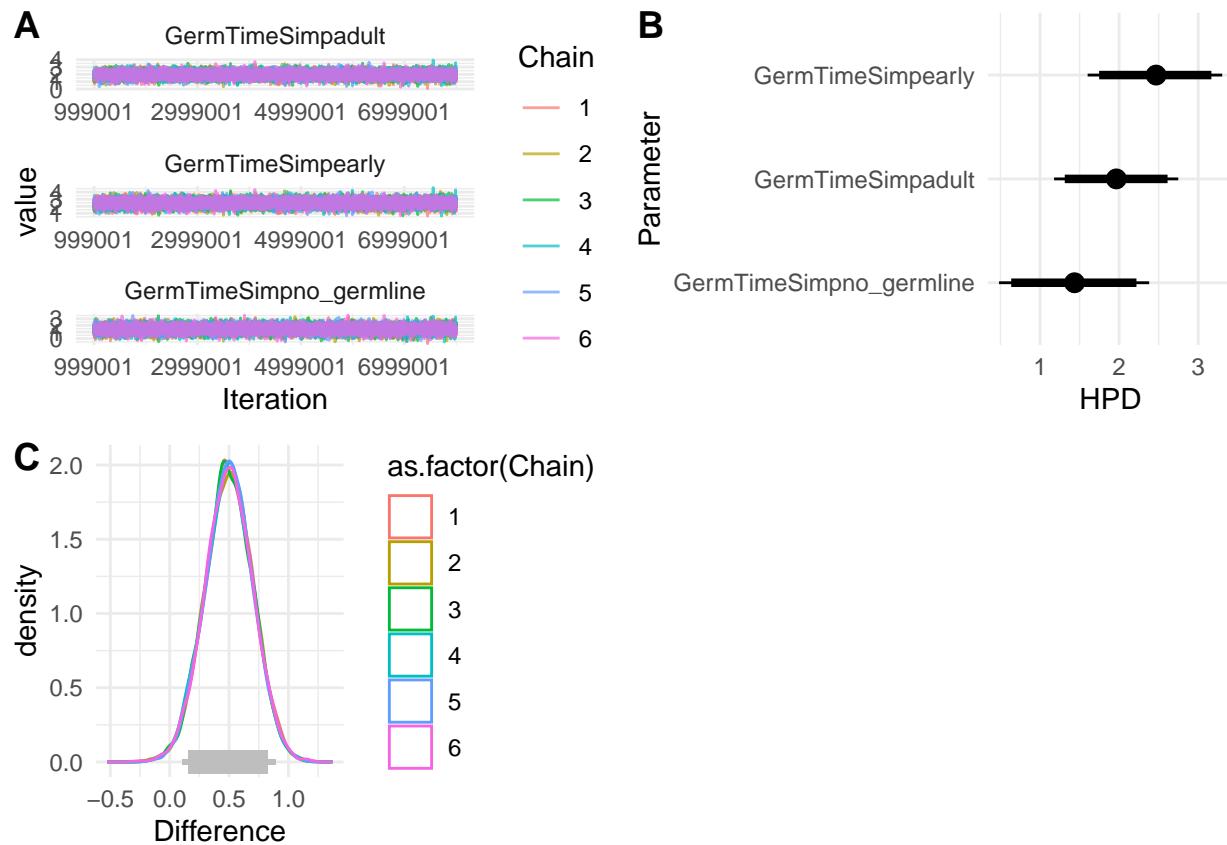
Table 23: Table S4.3.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
GermTimeSimpadult	1.96 (1.2, 2.73)	0.000
GermTimeSimpearly	2.46 (1.66, 3.35)	0.000
GermTimeSimpno_germline	1.51 (0.5, 2.35)	0.005
scale(log(Number))	0.61 (0.48, 0.76)	0.000

Table 24: Table S4.3.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
GermTimeSimpadult vs GermTimeSimpearly	-0.44 (-0.92, -0.13)	0.015
GermTimeSimpadult vs GermTimeSimpno_germline	0.52 (-0.09, 1.18)	0.099
GermTimeSimpadult vs scale(log(Number))	1.25 (0.63, 2.19)	0.002
GermTimeSimpearly vs GermTimeSimpno_germline	0.97 (0.3, 1.75)	0.006
GermTimeSimpearly vs scale(log(Number))	1.88 (1.02, 2.73)	0.000
GermTimeSimpno_germline vs scale(log(Number))	0.73 (-0.1, 1.74)	0.088

Model 4, prior set p3



### **Model 5: *Number of Cell Types ~ Timing of Germeline Segregation***

- Table S5.1.1: estimates of fixed effects for model 5, with prior set 1
- Table S5.1.2: comparison of fixed effects for model 5, with prior set 1
- Table S5.2.1: estimates of fixed effects for model 5, with prior set 2
- Table S5.2.2: comparison of fixed effects for model 5, with prior set 2
- Table S5.3.1: estimates of fixed effects for model 5, with prior set 3
- Table S5.3.2: comparison of fixed effects for model 5, with prior set 3

Table 25: Table S5.1.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
GermTimeSimpadult	1.67 (0.51, 3.15)	0.011
GermTimeSimpearly	2.31 (0.93, 3.73)	0.003
GermTimeSimpno_germline	1.03 (-0.48, 2.4)	0.215

Table 26: Table S5.1.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
GermTimeSimpadult vs GermTimeSimpearly	-0.52 (-0.94, 0.06)	0.082
GermTimeSimpadult vs GermTimeSimpno_germline	1.01 (0.16, 1.68)	0.021
GermTimeSimpearly vs GermTimeSimpno_germline	1.35 (0.48, 2.27)	0.005

Model 4WithoutCellNumber, prior set p1

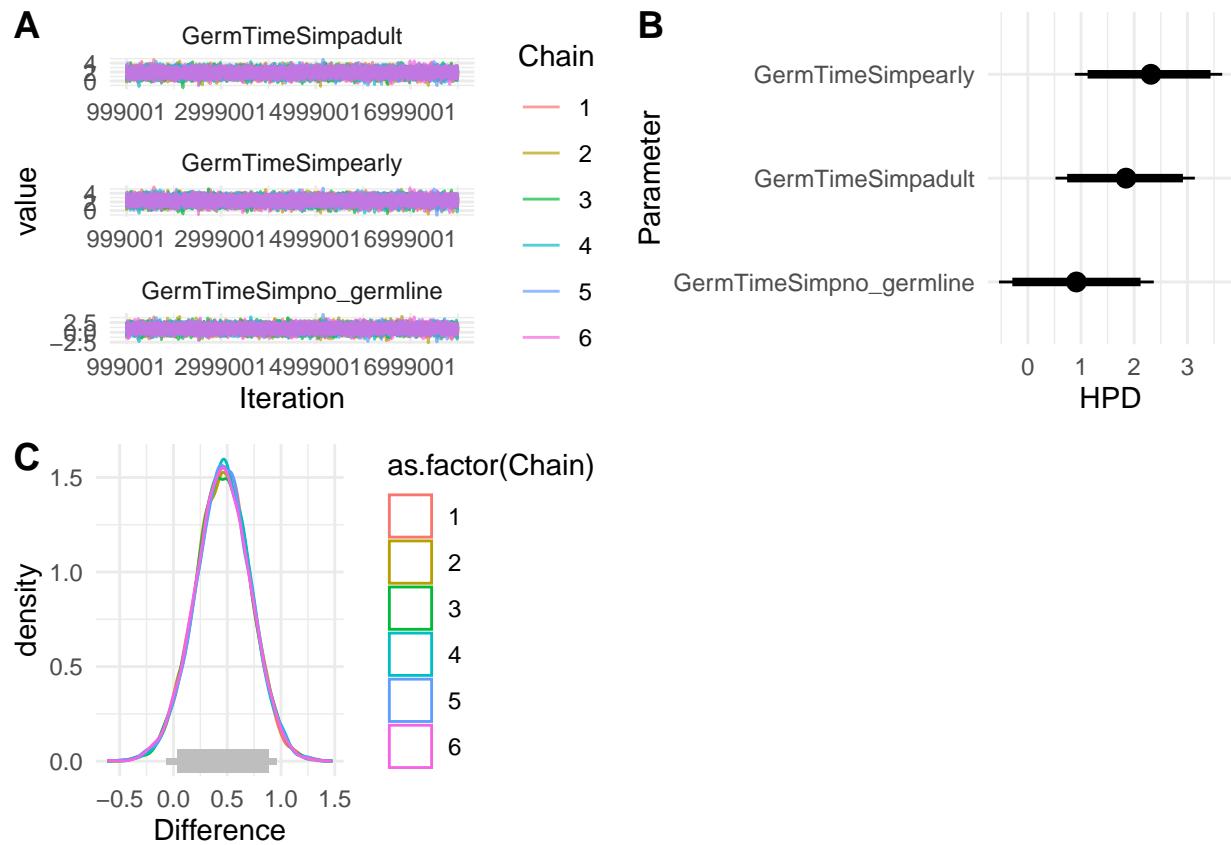


Table 27: Table S5.2.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
GermTimeSimpadult	1.92 (0.67, 2.99)	0.003
GermTimeSimpearly	2.31 (1.09, 3.59)	0.001
GermTimeSimpno_germline	0.83 (-0.38, 2.24)	0.185

Table 28: Table S5.2.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
GermTimeSimpadult vs GermTimeSimpearly	-0.47 (-1, 0.01)	0.057
GermTimeSimpadult vs GermTimeSimpno_germline	0.91 (0.23, 1.71)	0.010
GermTimeSimpearly vs GermTimeSimpno_germline	1.5 (0.61, 2.37)	0.001

Model 4WithoutCellNumber, prior set p2

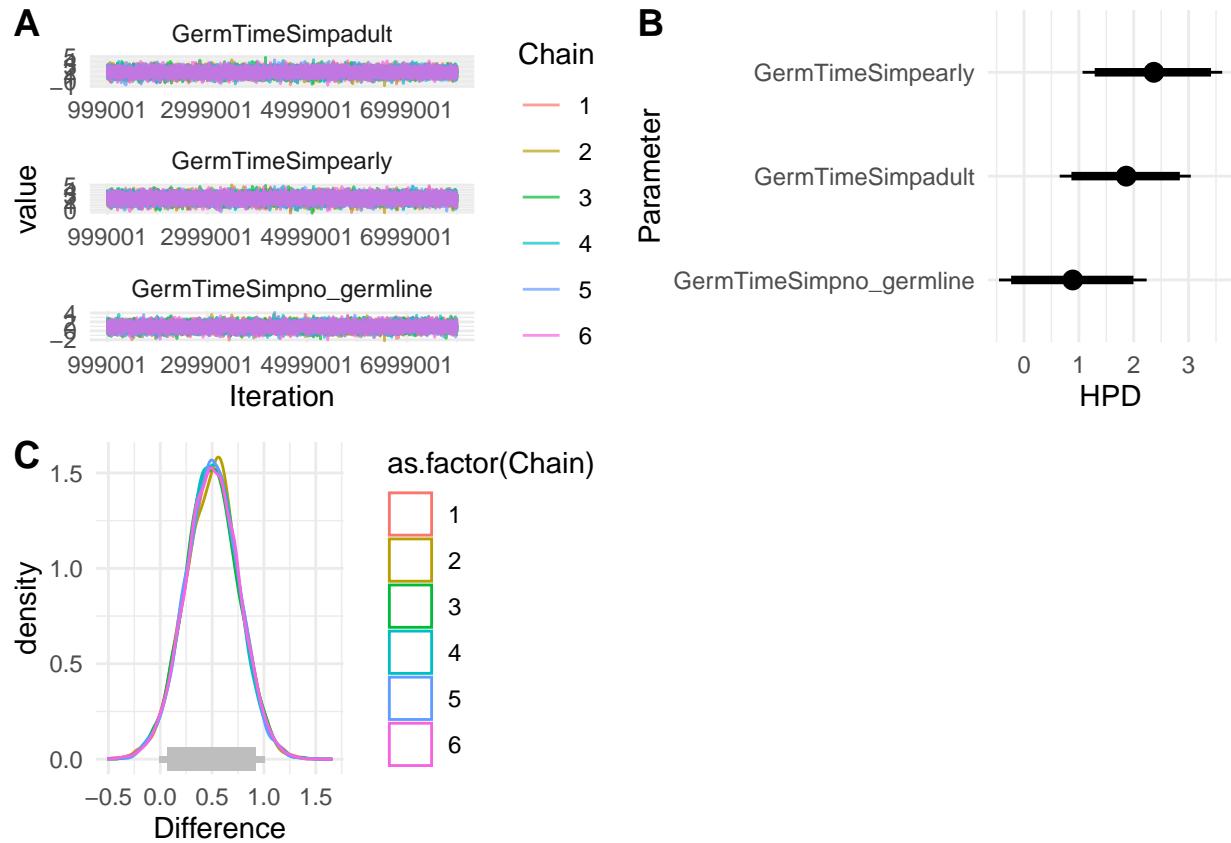


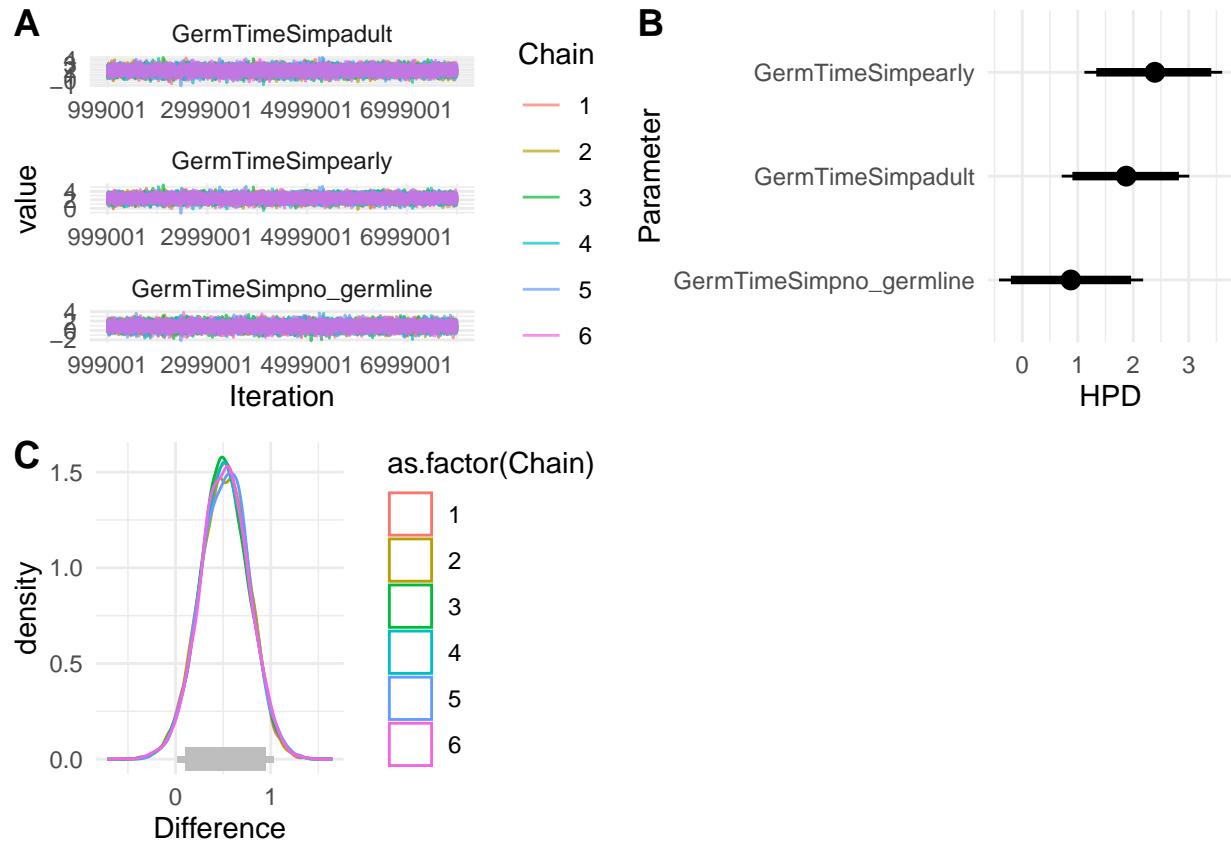
Table 29: Table S5.3.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
GermTimeSimpadult	1.92 (0.73, 3)	0.002
GermTimeSimpearly	2.41 (1.13, 3.61)	0.001
GermTimeSimpno_germline	0.67 (-0.44, 2.17)	0.177

Table 30: Table S5.3.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
GermTimeSimpadult vs GermTimeSimpearly	-0.51 (-0.98, 0.01)	0.050
GermTimeSimpadult vs GermTimeSimpno_germline	0.97 (0.24, 1.72)	0.008
GermTimeSimpearly vs GermTimeSimpno_germline	1.53 (0.62, 2.37)	0.001

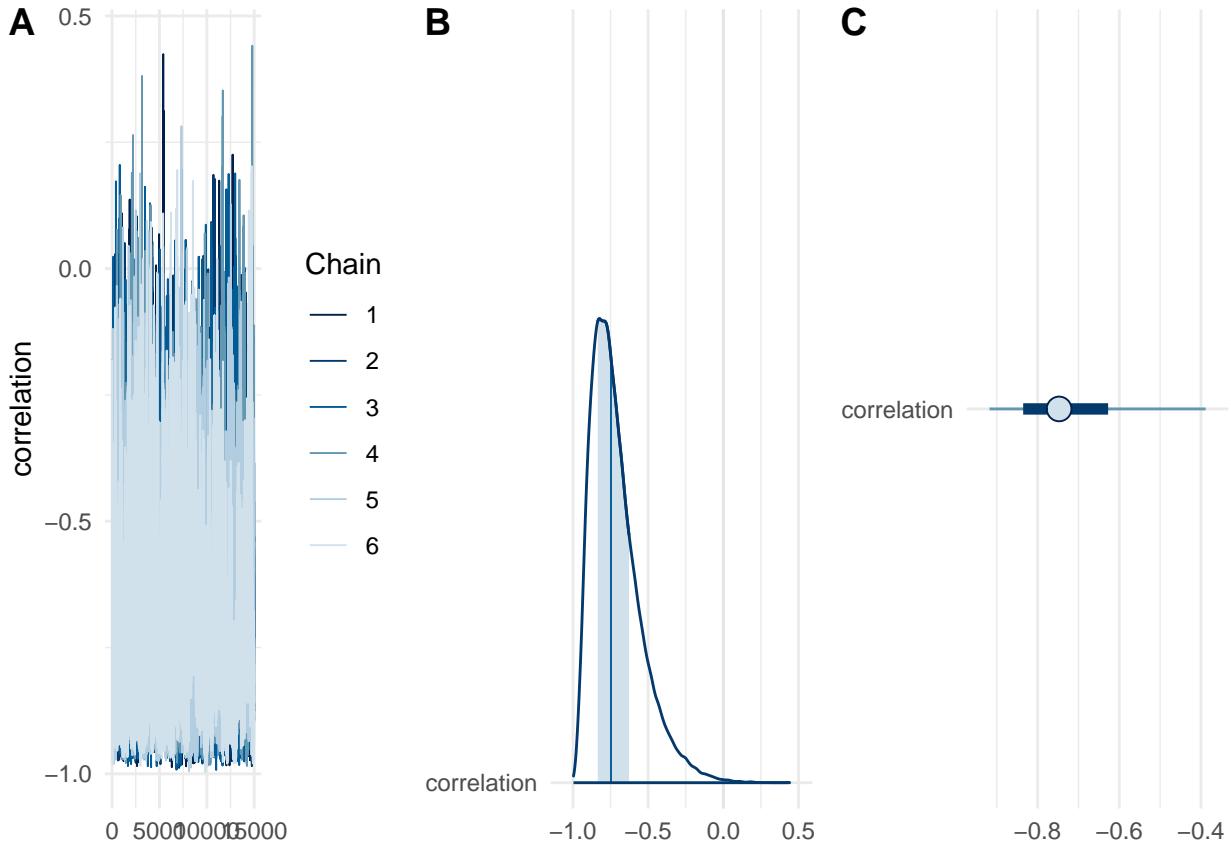
Model 4WithoutCellNumber, prior set p3



## Correlation between germline and fission

This analysis was run to test for a phylogenetic association between early germline segregation and a strict bottleneck separating each generation. Prior set 4 above was used.

Figure: A shows the convergence of all chains, B and C both show the posterior estimates and confidence intervals for the correlation between the *absence* of a strict bottleneck, and the *presence* of early germline segregation. This is shown only for 1 chain.



For each chain, the posterior CI were as follows

```
## [[1]]
##           lower      upper
## correlation -0.9696967 -0.4072963
## attr(,"Probability")
## [1] 0.95
##
## [[2]]
##           lower      upper
## correlation -0.9663845 -0.3967692
## attr(,"Probability")
## [1] 0.95
##
## [[3]]
##           lower      upper
## correlation -0.9697939 -0.37031
## attr(,"Probability")
```

```

## [1] 0.95
##
## [[4]]
##           lower      upper
## correlation -0.9701184 -0.3398562
## attr(,"Probability")
## [1] 0.95
##
## [[5]]
##           lower      upper
## correlation -0.9602928 -0.3857945
## attr(,"Probability")
## [1] 0.95
##
## [[6]]
##           lower      upper
## correlation -0.9741115 -0.3902415
## attr(,"Probability")
## [1] 0.95

```

## Excluding data from congeners

### Model 6: *Number of Cells ~ Presence of Strict Bottleneck*

- Table S6.1.1: estimates of fixed effects for model 1, with prior set 1
- Table S6.1.2: comparison of fixed effects for model 1, with prior set 1
- Table S6.2.1: estimates of fixed effects for model 1, with prior set 2
- Table S6.2.2: comparison of fixed effects for model 1, with prior set 2
- Table S6.3.1: estimates of fixed effects for model 1, with prior set 3
- Table S6.3.2: comparison of fixed effects for model 1, with prior set 3

Table 31: Table S6.1.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
Fission0	14.25 (-2.27, 25.55)	0.083
Fission1	10.76 (-2.93, 24.83)	0.123

Table 32: Table S6.1.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
Fission0 vs Fission1	1.51 (-0.66, 3.25)	0.204

Model 6, prior set p1

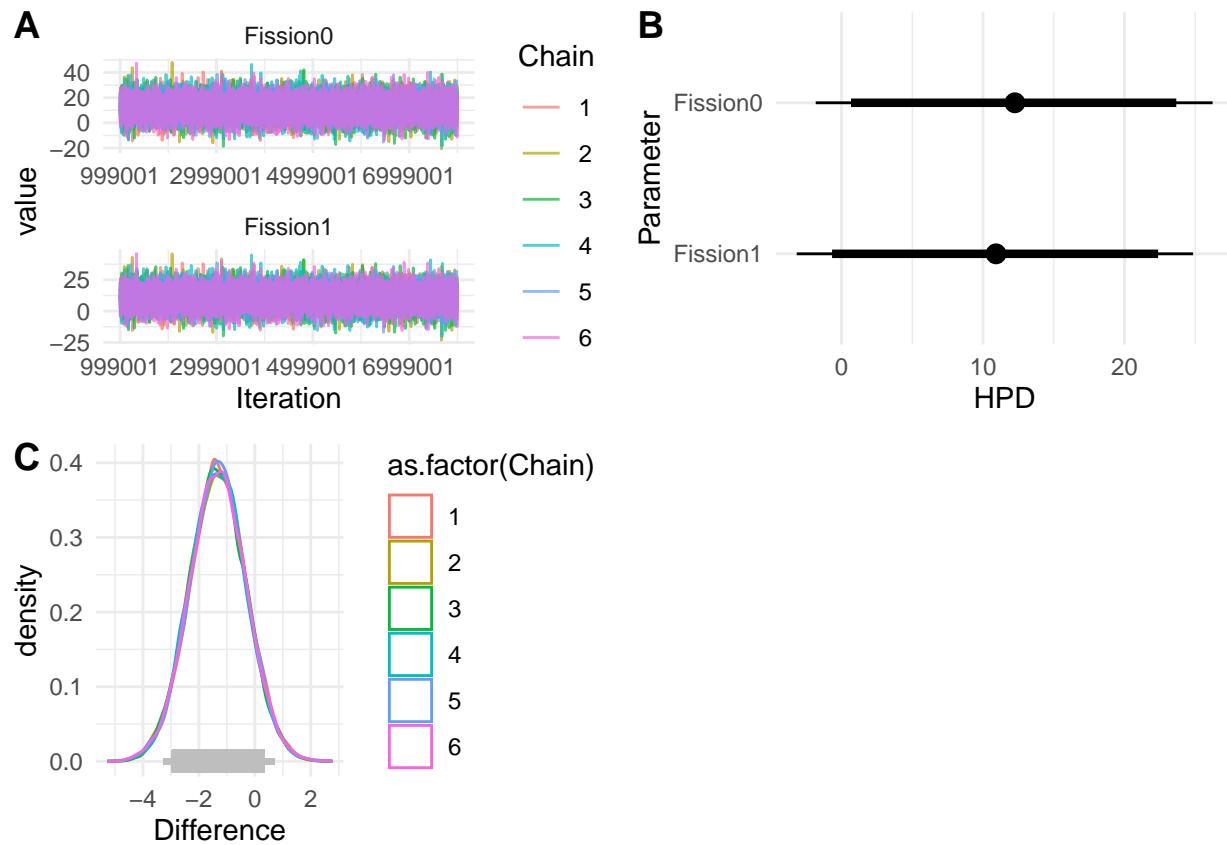


Table 33: Table S6.2.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
Fission0	11.15 (-1.65, 25.57)	0.083
Fission1	12.05 (-3.63, 23.63)	0.120

Table 34: Table S6.2.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
Fission0 vs Fission1	1.44 (-0.78, 3.23)	0.203

Model 6, prior set p2

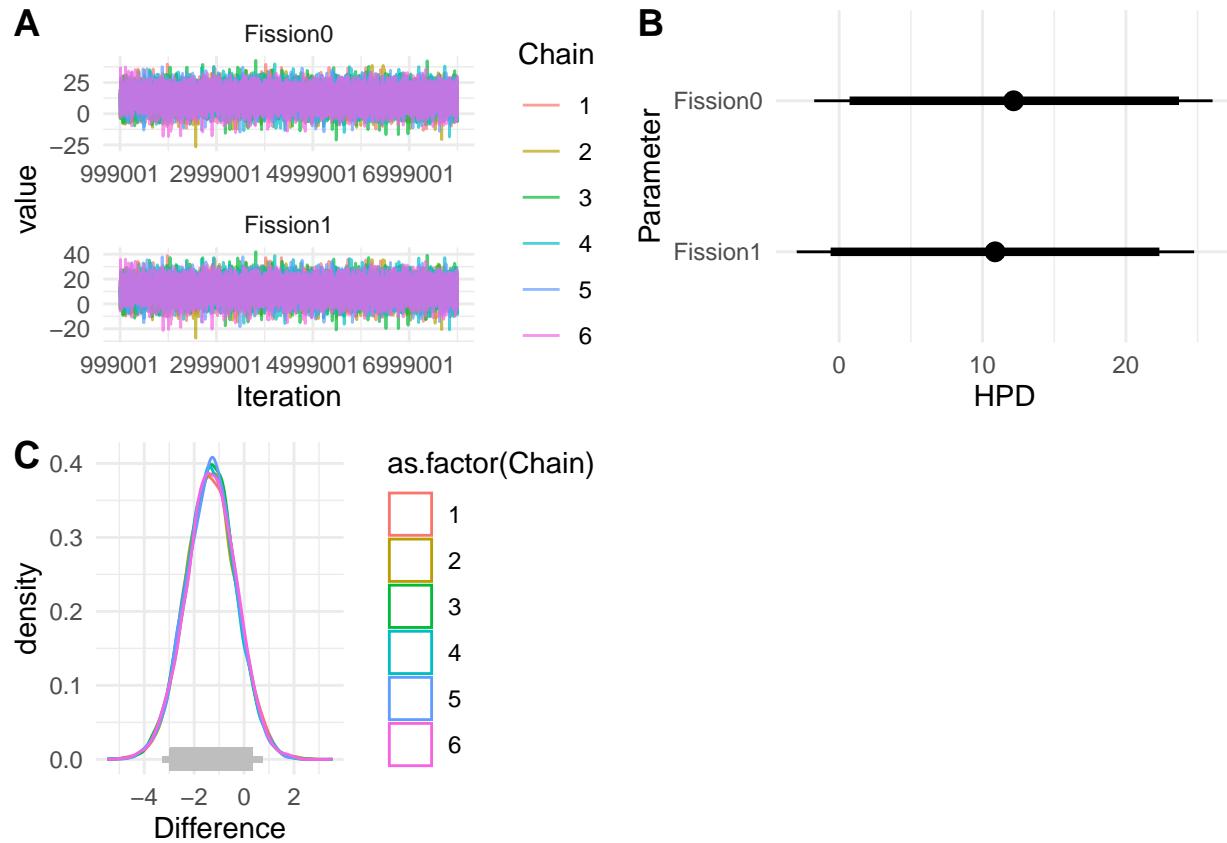


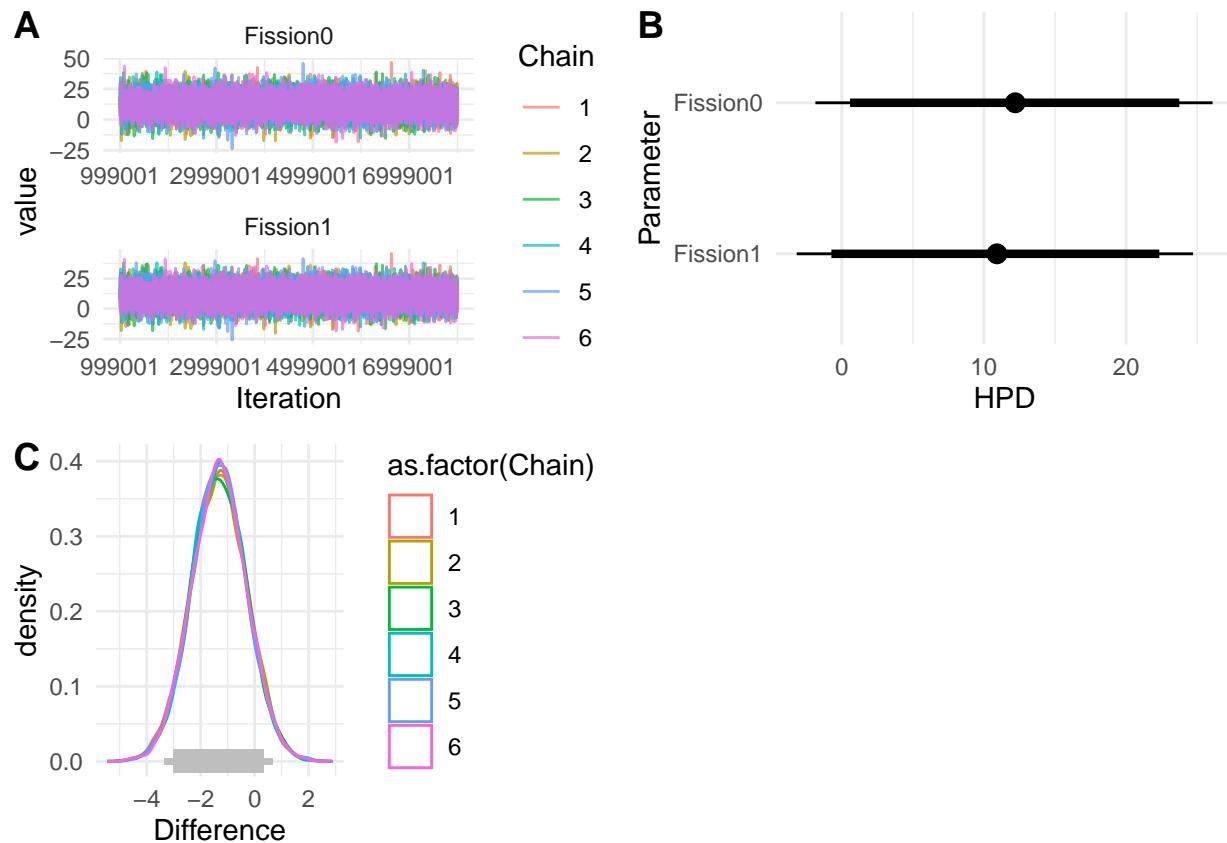
Table 35: Table S6.3.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
Fission0	11.66 (-1.28, 25.68)	0.075
Fission1	10.38 (-2.32, 24.75)	0.113

Table 36: Table S6.3.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
Fission0 vs Fission1	1.18 (-0.68, 3.33)	0.19

Model 6, prior set p3



**Model 7:**  $\text{Number of cell types} \sim \text{Presence of Strict Bottleneck} + \log(\text{Number of Cells})$

- Table S7.1.1: estimates of fixed effects for model 2, with prior set 1
- Table S7.1.2: comparison of fixed effects for model 2, with prior set 1
- Table S7.2.1: estimates of fixed effects for model 2, with prior set 2
- Table S7.2.2: comparison of fixed effects for model 2, with prior set 2
- Table S7.3.1: estimates of fixed effects for model 2, with prior set 3
- Table S7.3.2: comparison of fixed effects for model 2, with prior set 3

Table 37: Table S7.1.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
Fission0	1.82 (0.81, 2.81)	0.001
Fission1	1.89 (0.76, 2.76)	0.001
scale(log(Number))	0.6 (0.49, 0.72)	0.000

Table 38: Table S7.1.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
Fission0 vs Fission1	0.05 (-0.14, 0.21)	0.668
Fission0 vs scale(log(Number))	1.27 (0.23, 2.24)	0.020
Fission1 vs scale(log(Number))	1.05 (0.16, 2.18)	0.023

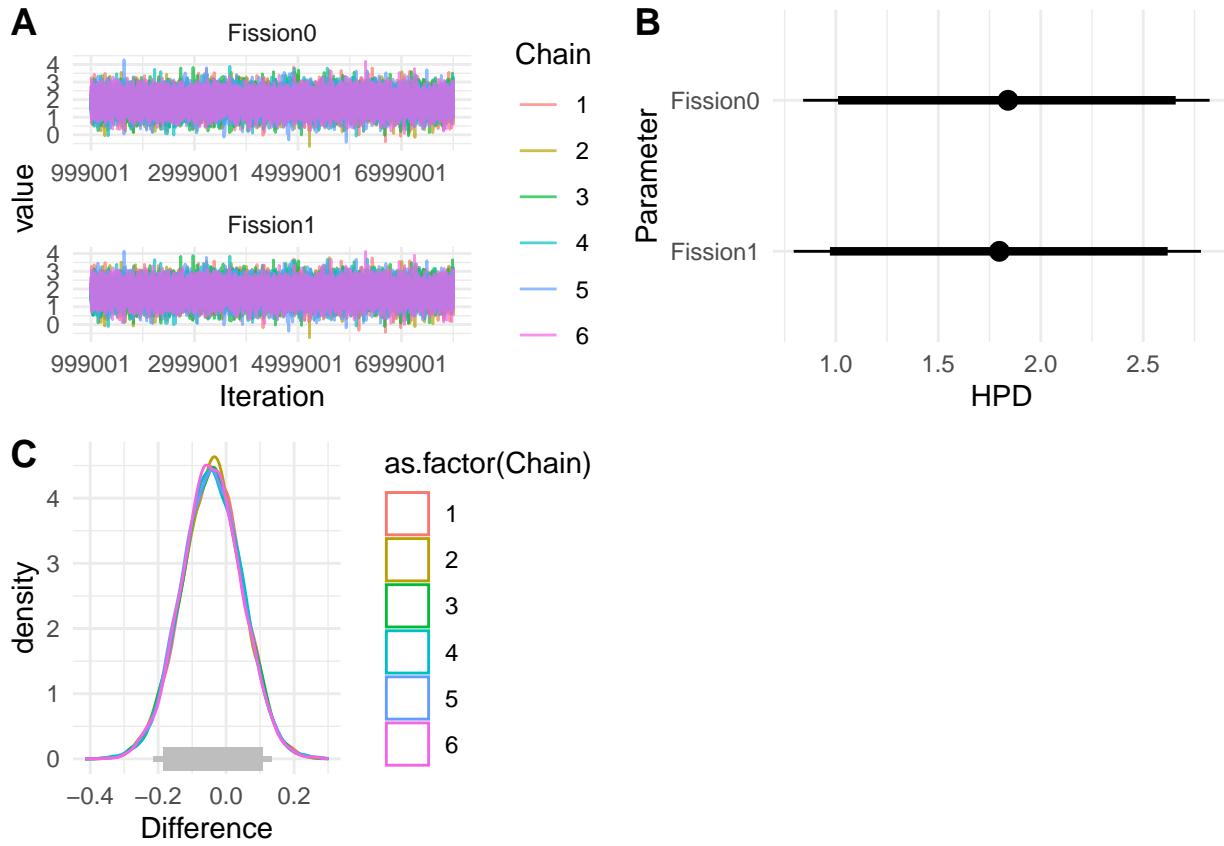


Table 39: Table S7.2.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
Fission0	1.96 (0.93, 2.73)	0
Fission1	1.91 (0.9, 2.71)	0
scale(log(Number))	0.63 (0.51, 0.78)	0

Table 40: Table S7.2.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
Fission0 vs Fission1	0.03 (-0.17, 0.25)	0.693
Fission0 vs scale(log(Number))	1.2 (0.28, 2.12)	0.011
Fission1 vs scale(log(Number))	1.19 (0.21, 2.03)	0.013

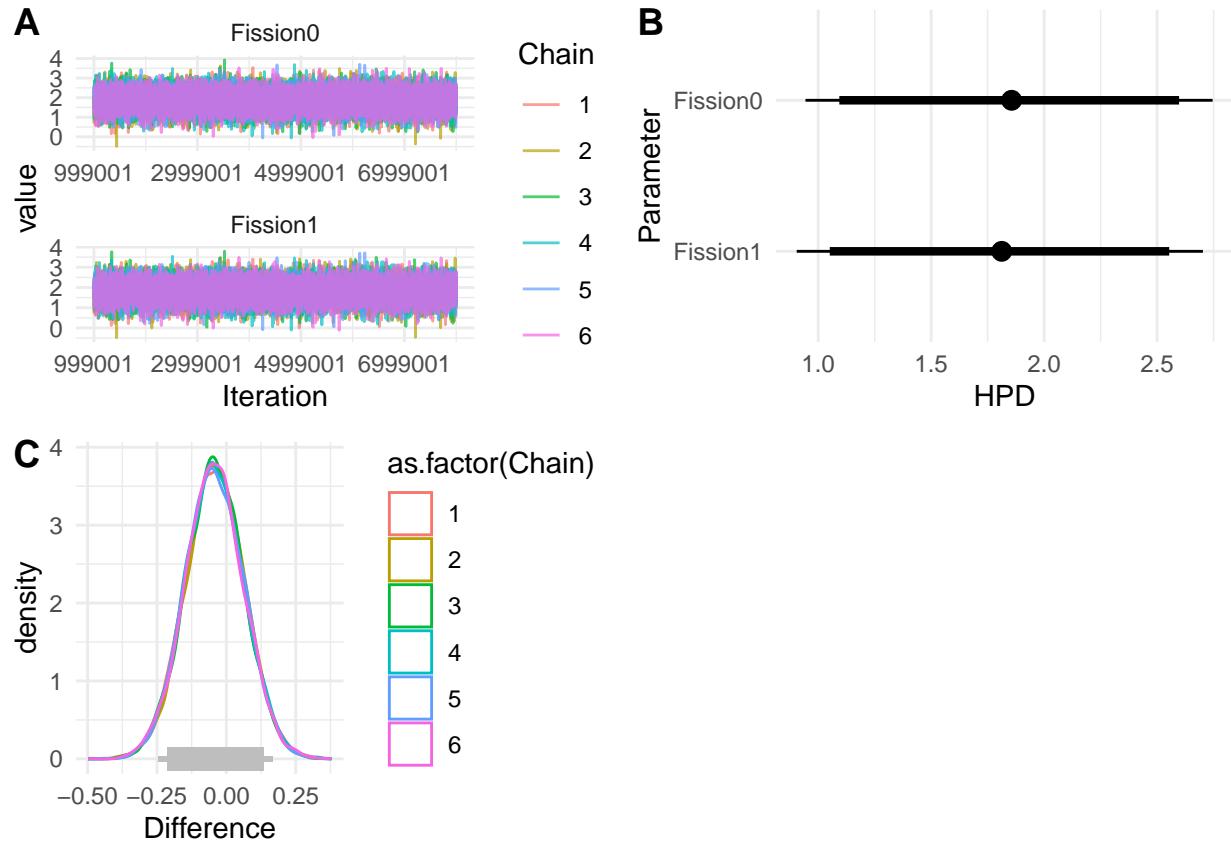
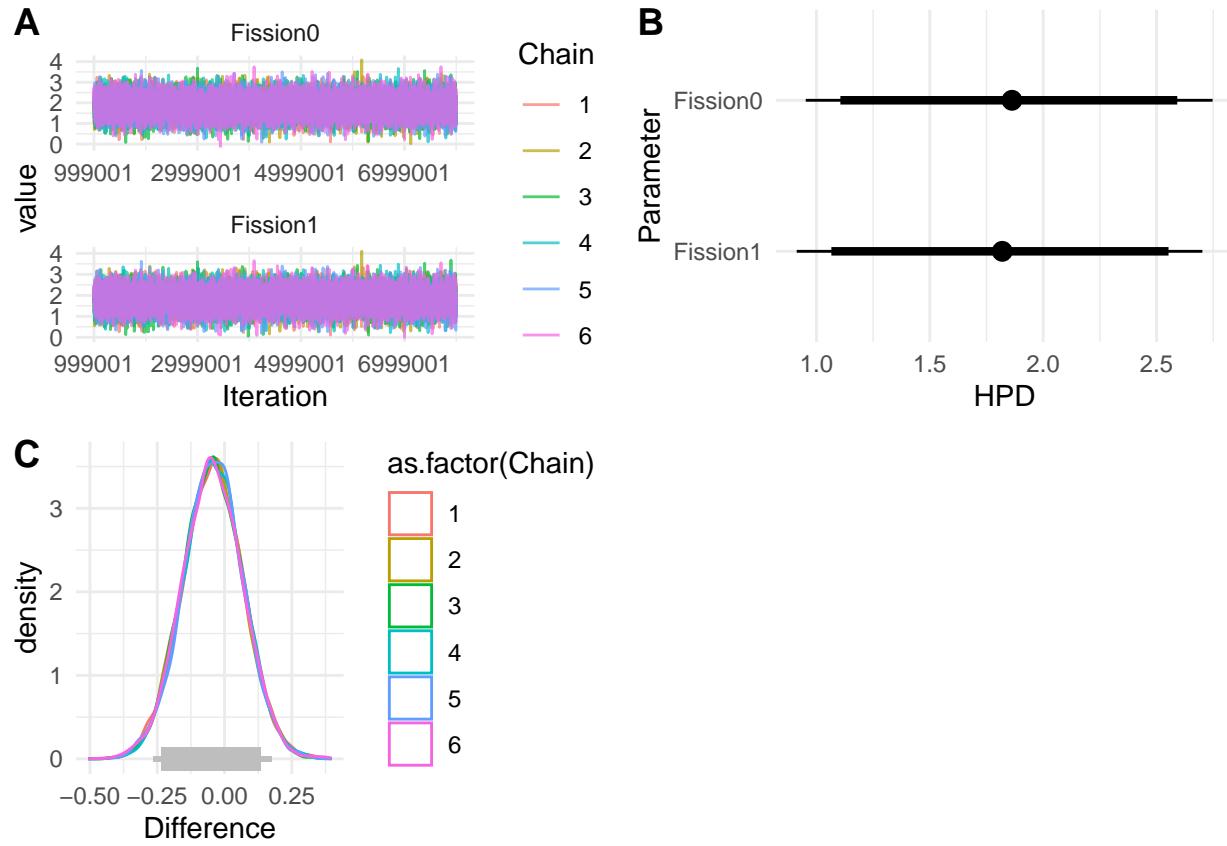


Table 41: Table S7.3.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
Fission0	1.99 (0.92, 2.72)	0
Fission1	1.88 (0.92, 2.71)	0
scale(log(Number))	0.66 (0.51, 0.8)	0

Table 42: Table S7.3.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
Fission0 vs Fission1	0.03 (-0.17, 0.27)	0.711
Fission0 vs scale(log(Number))	1.08 (0.25, 2.08)	0.011
Fission1 vs scale(log(Number))	1.22 (0.26, 2.08)	0.012



**Model 8: *Number of cells ~ timing of germline segregation***

- Table S8.1.1: estimates of fixed effects for model 3, with prior set 1
- Table S8.1.2: comparison of fixed effects for model 3, with prior set 1
- Table S8.2.1: estimates of fixed effects for model 3, with prior set 2
- Table S8.2.2: comparison of fixed effects for model 3, with prior set 2
- Table S8.3.1: estimates of fixed effects for model 3, with prior set 3
- Table S8.3.2: comparison of fixed effects for model 3, with prior set 3

Table 43: Table S8.1.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
GermTimeSimpadult	12.98 (-0.19, 25.3)	0.046
GermTimeSimpearly	14.01 (0.47, 26.88)	0.051
GermTimeSimpno_germline	6.41 (-4.62, 21.59)	0.210

Table 44: Table S8.1.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
GermTimeSimpadult vs GermTimeSimpearly	-0.4 (-4.96, 3.89)	0.833
GermTimeSimpadult vs GermTimeSimpno_germline	5.08 (0.68, 9.11)	0.028
GermTimeSimpearly vs GermTimeSimpno_germline	4.57 (-0.77, 11.31)	0.091

Model 8, prior set p1

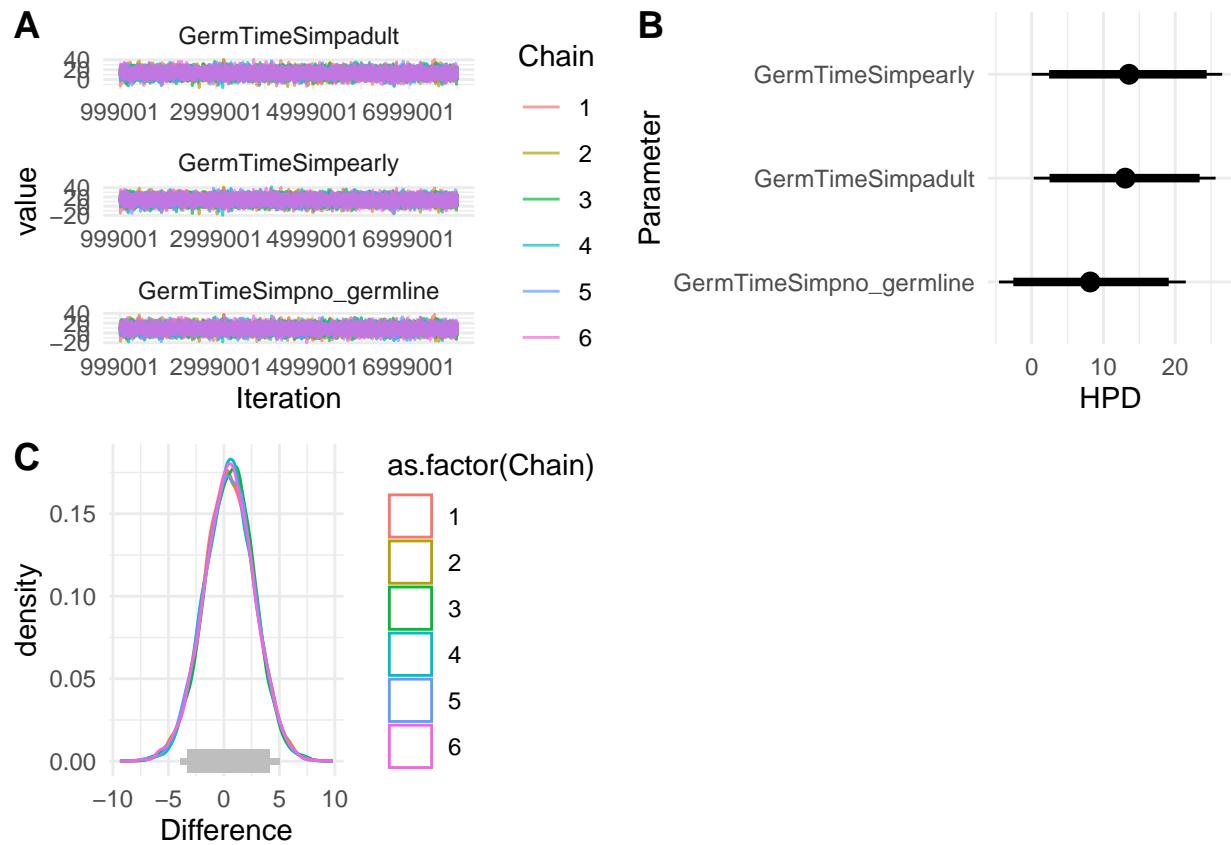


Table 45: Table S8.2.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
GermTimeSimpadult	11.84 (1.21, 25.58)	0.039
GermTimeSimpearly	14.89 (0.68, 26.32)	0.044
GermTimeSimpno_germline	5.73 (-4.2, 21.1)	0.195

Table 46: Table S8.2.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
GermTimeSimpadult vs GermTimeSimpearly	-0.41 (-5, 3.78)	0.788
GermTimeSimpadult vs GermTimeSimpno_germline	5.02 (0.7, 9.01)	0.017
GermTimeSimpearly vs GermTimeSimpno_germline	5.36 (-0.4, 11.76)	0.083

Model 8, prior set p2

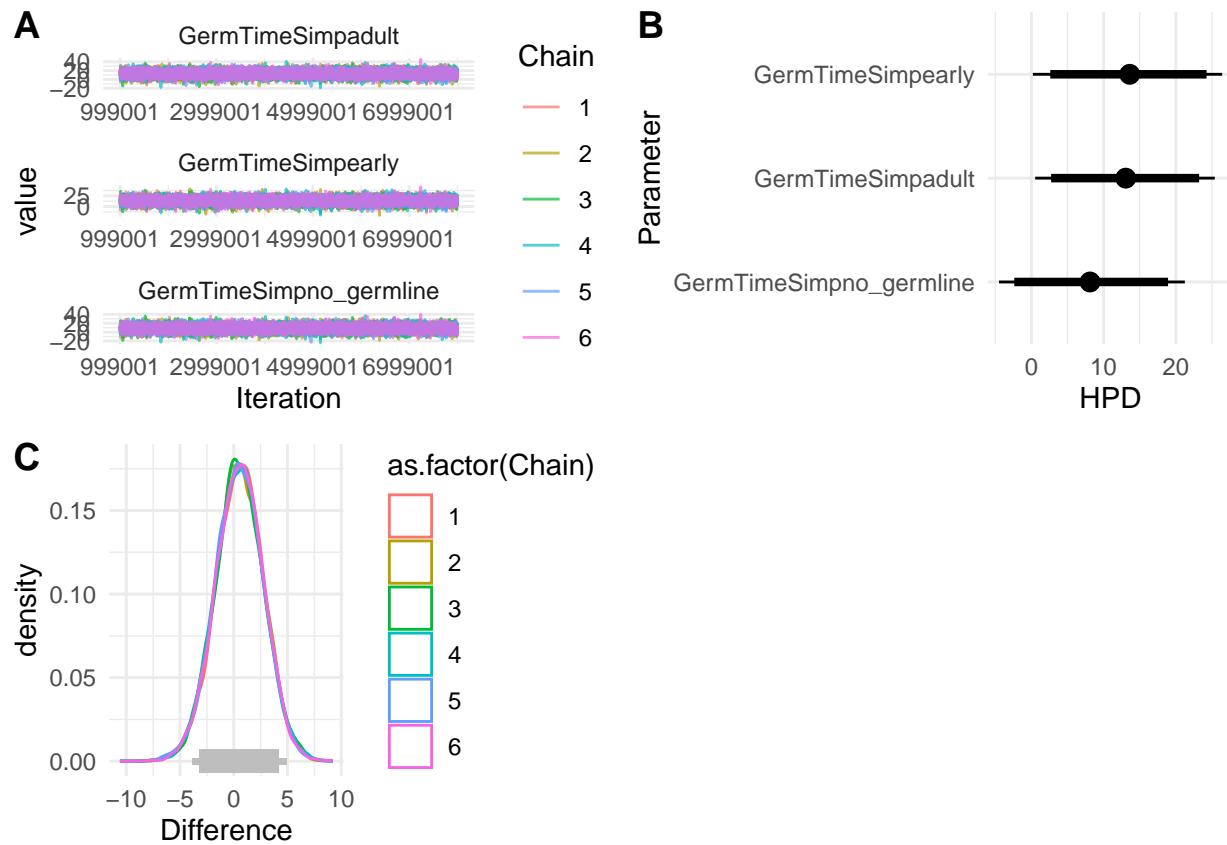


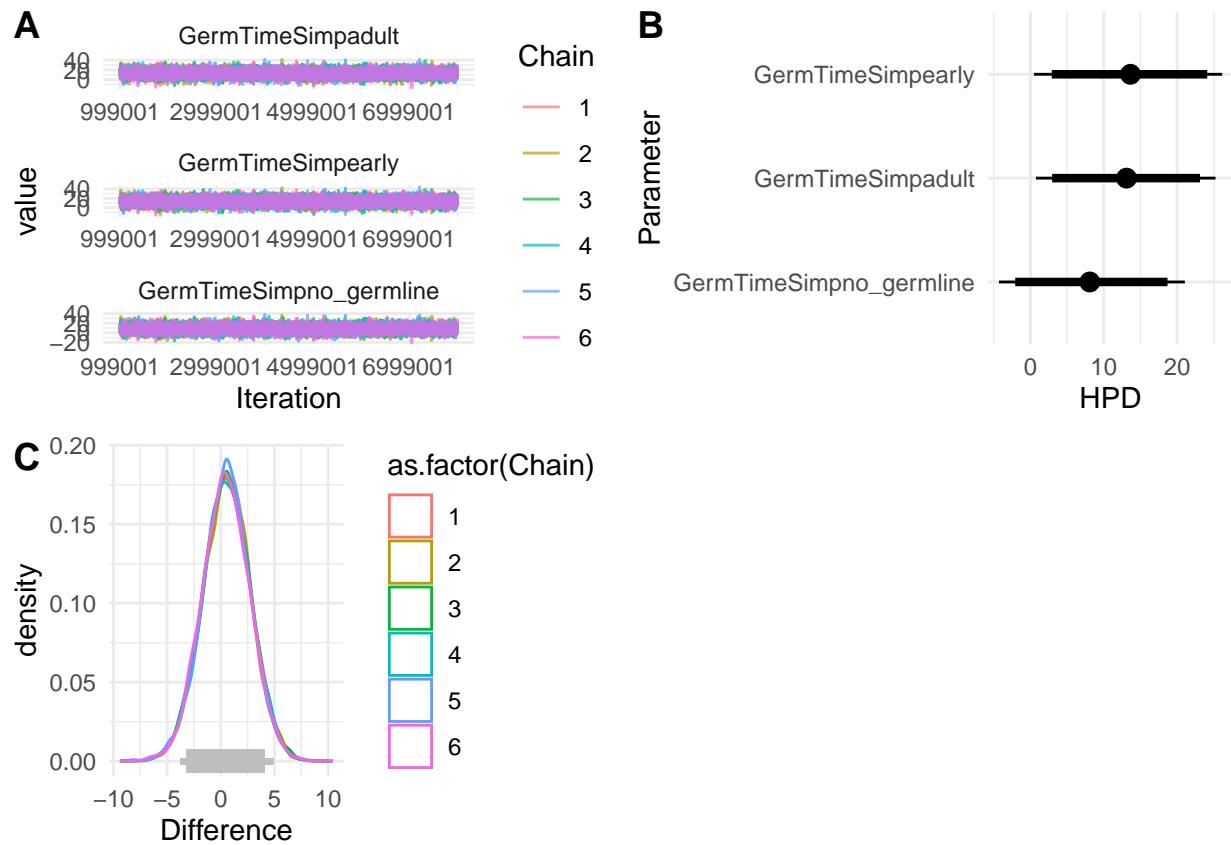
Table 47: Table S8.3.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
GermTimeSimpadult	13.63 (1.15, 25.55)	0.038
GermTimeSimpearly	13.79 (1.15, 26.4)	0.043
GermTimeSimpno_germline	8.04 (-3.86, 21.51)	0.183

Table 48: Table S8.3.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
GermTimeSimpadult vs GermTimeSimpearly	-0.28 (-4.84, 3.81)	0.803
GermTimeSimpadult vs GermTimeSimpno_germline	4.89 (0.96, 9.31)	0.023
GermTimeSimpearly vs GermTimeSimpno_germline	5.61 (-0.47, 11.46)	0.082

Model 8, prior set p3



**Model 9:  $\text{Number of cell types} \sim \text{timing of germline segregation} + \log(\text{Number of cells})$**

- Table S9.1.1: estimates of fixed effects for model 4, with prior set 1
- Table S9.1.2: comparison of fixed effects for model 4, with prior set 1
- Table S9.2.1: estimates of fixed effects for model 4, with prior set 2
- Table S9.2.2: comparison of fixed effects for model 4, with prior set 2
- Table S9.3.1: estimates of fixed effects for model 4, with prior set 3
- Table S9.3.2: comparison of fixed effects for model 4, with prior set 3

Table 49: Table S9.1.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
GermTimeSimpadult	2.09 (1, 2.77)	0.000
GermTimeSimpearly	2.45 (1.44, 3.32)	0.000
GermTimeSimpno_germline	1.34 (0.37, 2.46)	0.009
scale(log(Number))	0.6 (0.48, 0.71)	0.000

Table 50: Table S9.1.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
GermTimeSimpadult vs GermTimeSimpearly	-0.54 (-0.88, -0.15)	0.008
GermTimeSimpadult vs GermTimeSimpno_germline	0.4 (-0.16, 1.12)	0.129
GermTimeSimpadult vs scale(log(Number))	1.31 (0.45, 2.22)	0.005
GermTimeSimpearly vs GermTimeSimpno_germline	0.91 (0.27, 1.74)	0.008
GermTimeSimpearly vs scale(log(Number))	1.99 (0.9, 2.79)	0.001
GermTimeSimpno_germline vs scale(log(Number))	0.94 (-0.19, 1.89)	0.121

Model 9, prior set p1

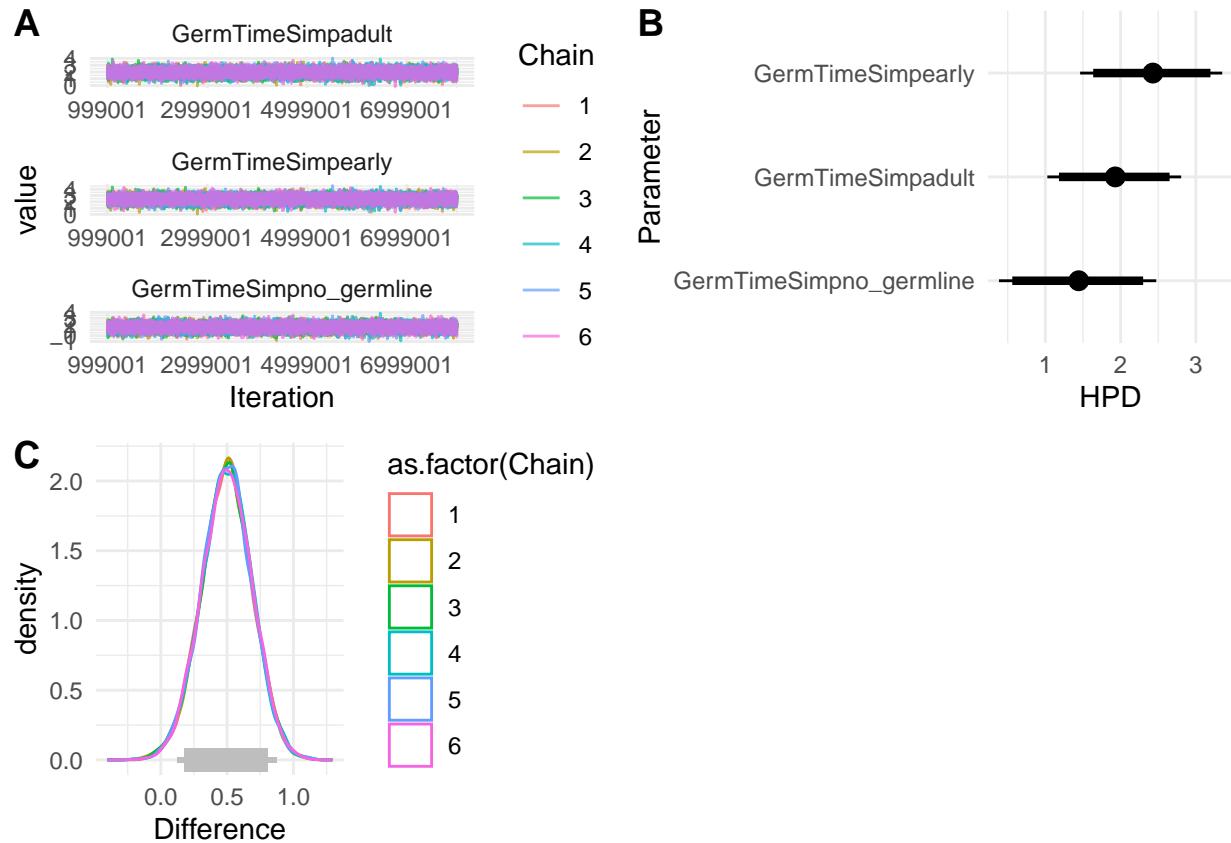


Table 51: Table S9.2.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
GermTimeSimpadult	1.98 (1.14, 2.74)	0.000
GermTimeSimpearly	2.53 (1.52, 3.27)	0.000
GermTimeSimpno_germline	1.51 (0.42, 2.36)	0.005
scale(log(Number))	0.61 (0.48, 0.75)	0.000

Table 52: Table S9.2.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
GermTimeSimpadult vs GermTimeSimpearly	-0.51 (-0.91, -0.14)	0.007
GermTimeSimpadult vs GermTimeSimpno_germline	0.47 (-0.15, 1.12)	0.123
GermTimeSimpadult vs scale(log(Number))	1.26 (0.47, 2.1)	0.003
GermTimeSimpearly vs GermTimeSimpno_germline	1 (0.25, 1.7)	0.007
GermTimeSimpearly vs scale(log(Number))	1.92 (0.99, 2.77)	0.000
GermTimeSimpno_germline vs scale(log(Number))	0.62 (-0.16, 1.76)	0.102

Model 9, prior set p2

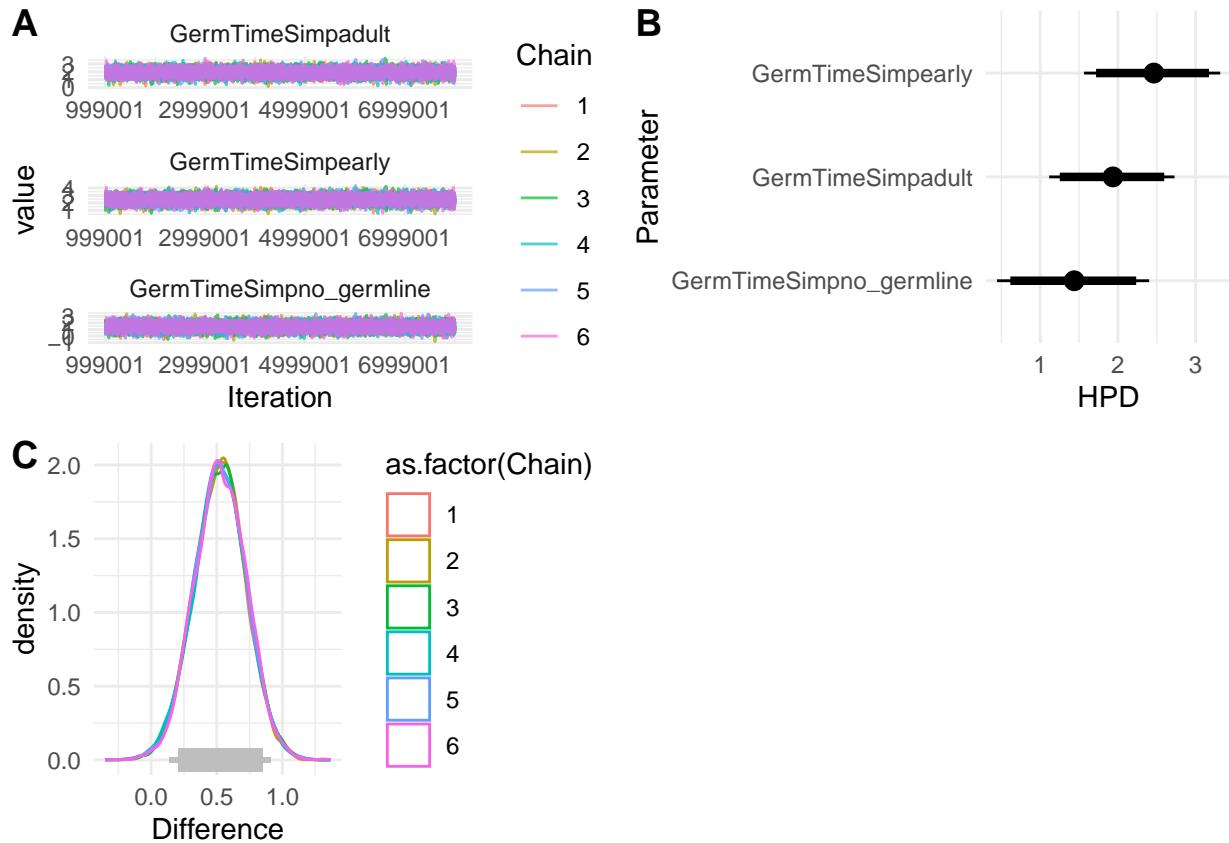


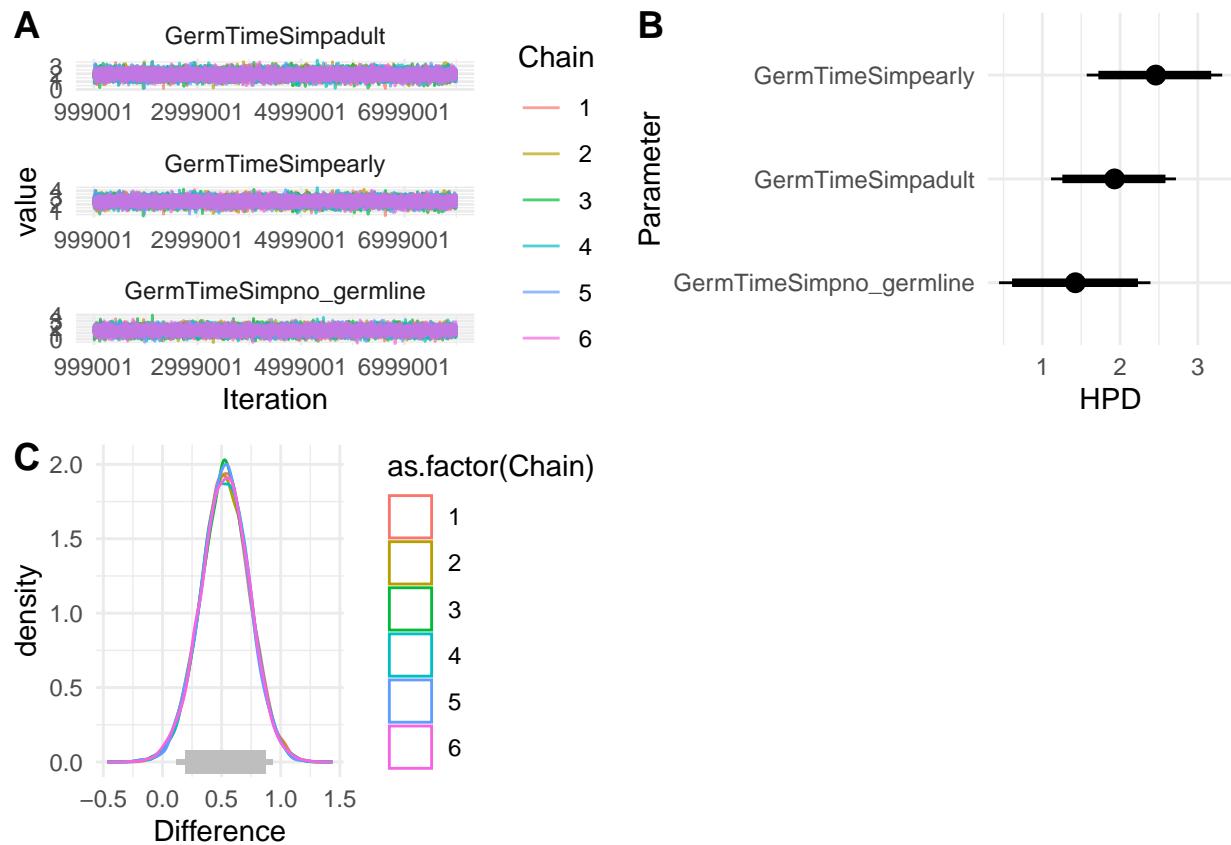
Table 53: Table S9.3.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
GermTimeSimpadult	1.94 (1.08, 2.68)	0.000
GermTimeSimpearly	2.57 (1.57, 3.3)	0.000
GermTimeSimpno_germline	1.54 (0.49, 2.4)	0.005
scale(log(Number))	0.64 (0.48, 0.77)	0.000

Table 54: Table S9.3.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
GermTimeSimpadult vs GermTimeSimpearly	-0.57 (-0.94, -0.13)	0.009
GermTimeSimpadult vs GermTimeSimpno_germline	0.44 (-0.14, 1.14)	0.123
GermTimeSimpadult vs scale(log(Number))	1.21 (0.48, 2.09)	0.002
GermTimeSimpearly vs GermTimeSimpno_germline	1.07 (0.32, 1.76)	0.006
GermTimeSimpearly vs scale(log(Number))	1.72 (0.99, 2.74)	0.001
GermTimeSimpno_germline vs scale(log(Number))	0.8 (-0.16, 1.74)	0.092

Model 9, prior set p3



**Model 10: *Number of cell types ~ timing of germline segregation***

- Table S10.1.1: estimates of fixed effects for model 5, with prior set 1
- Table S10.1.2: comparison of fixed effects for model 5, with prior set 1
- Table S10.2.1: estimates of fixed effects for model 5, with prior set 2
- Table S10.2.2: comparison of fixed effects for model 5, with prior set 2
- Table S10.3.1: estimates of fixed effects for model 5, with prior set 3
- Table S10.3.2: comparison of fixed effects for model 5, with prior set 3

Table 55: Table S5.1.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
GermTimeSimpadult	1.86 (0.36, 3.18)	0.015
GermTimeSimpearly	2.62 (0.82, 3.77)	0.006
GermTimeSimpno_germline	1.13 (-0.57, 2.47)	0.208

Table 56: Table S5.1.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
GermTimeSimpadult vs GermTimeSimpearly	-0.43 (-0.99, 0.05)	0.091
GermTimeSimpadult vs GermTimeSimpno_germline	0.88 (0.09, 1.6)	0.025
GermTimeSimpearly vs GermTimeSimpno_germline	1.36 (0.37, 2.2)	0.005

Model 10, prior set p1

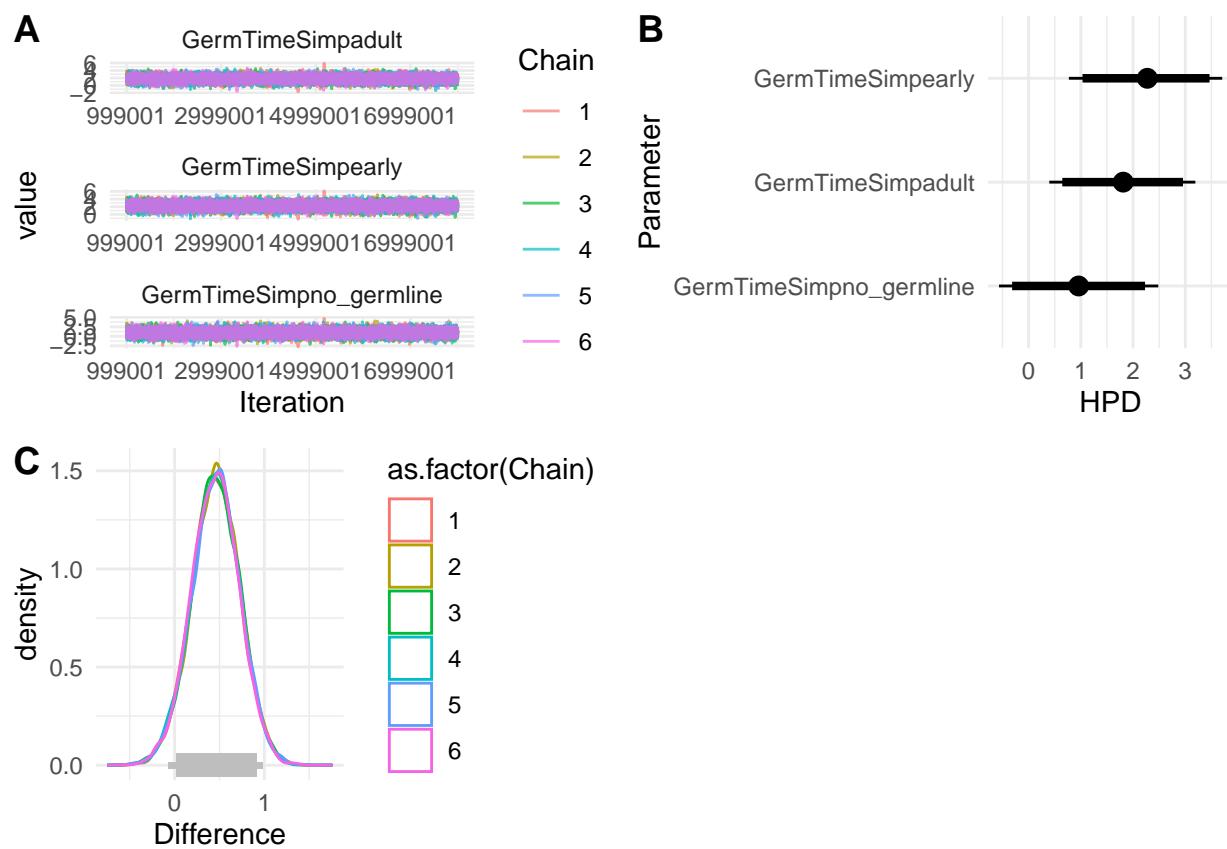


Table 57: Table S5.2.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
GermTimeSimpadult	1.93 (0.62, 3.04)	0.005
GermTimeSimpearly	2.43 (1.03, 3.62)	0.001
GermTimeSimpno_germline	0.93 (-0.43, 2.31)	0.187

Table 58: Table S5.2.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
GermTimeSimpadult vs GermTimeSimpearly	-0.57 (-1.03, -0.01)	0.059
GermTimeSimpadult vs GermTimeSimpno_germline	0.86 (0.15, 1.67)	0.016
GermTimeSimpearly vs GermTimeSimpno_germline	1.5 (0.48, 2.25)	0.002

Model 10, prior set p2

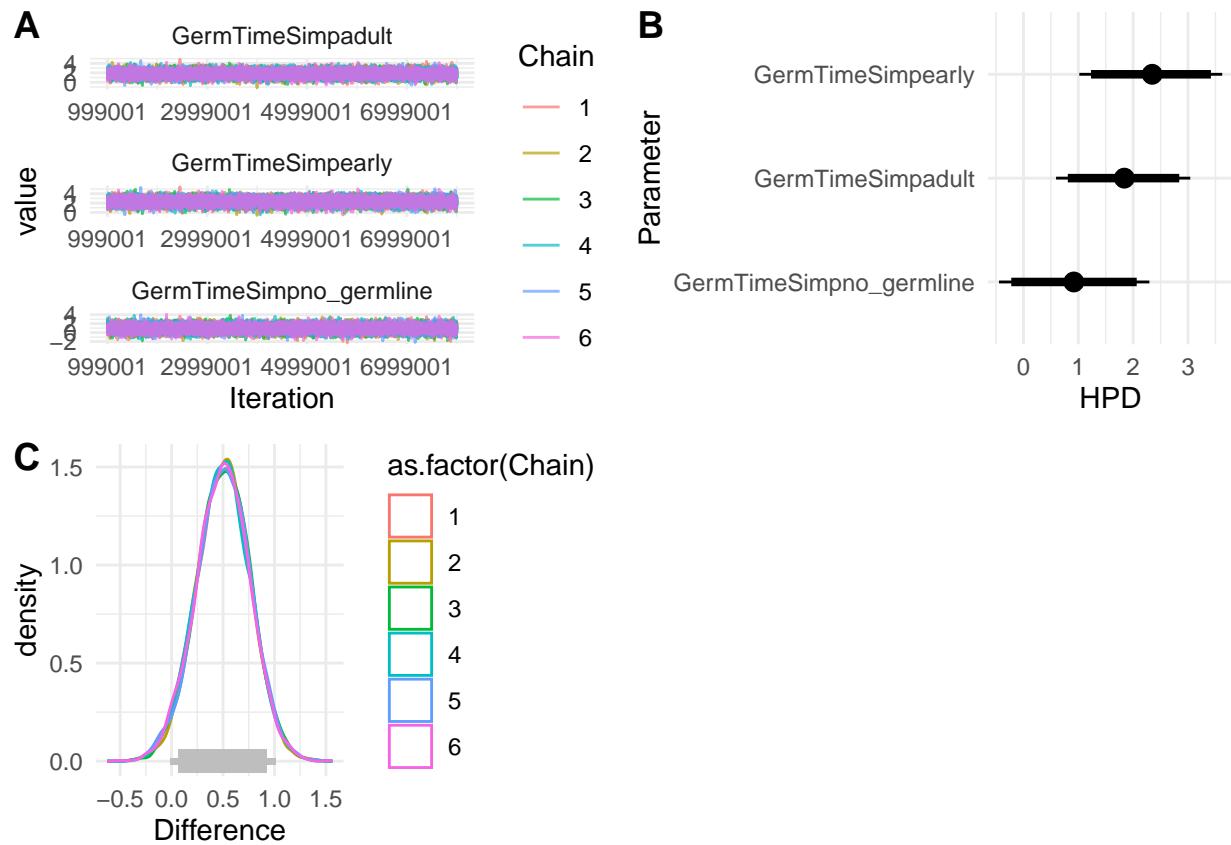


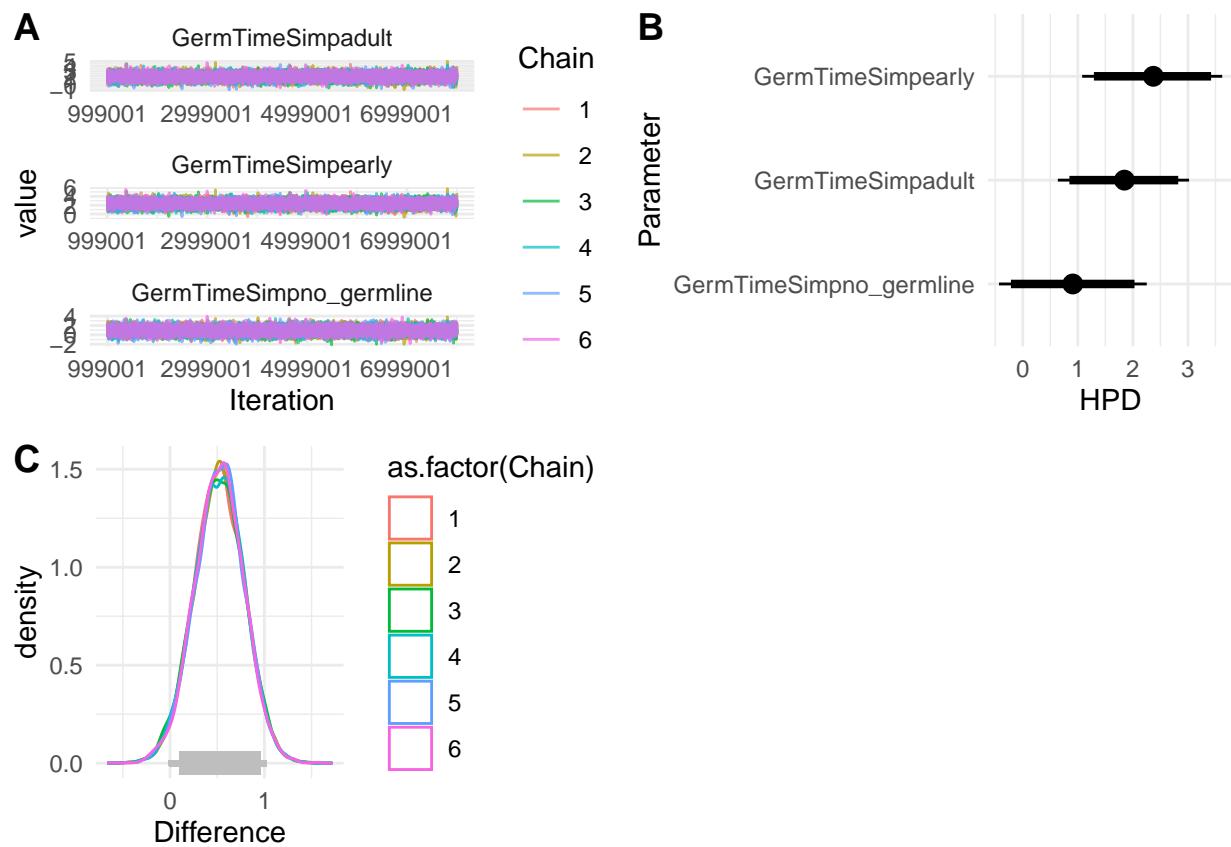
Table 59: Table S5.3.1: Estimates of Fixed Effects

Fixed Effects	Posterior Mode (CI)	pMCMC
GermTimeSimpadult	1.93 (0.64, 3.04)	0.003
GermTimeSimpearly	2.5 (1.12, 3.64)	0.001
GermTimeSimpno_germline	0.93 (-0.46, 2.21)	0.193

Table 60: Table S5.3.2: Comparisons of Fixed Effects

Fixed Effects Comparisons	Posterior Mode (CI)	pMCMC
GermTimeSimpadult vs GermTimeSimpearly	-0.57 (-0.99, 0.03)	0.052
GermTimeSimpadult vs GermTimeSimpno_germline	0.87 (0.18, 1.68)	0.013
GermTimeSimpearly vs GermTimeSimpno_germline	1.36 (0.54, 2.35)	0.001

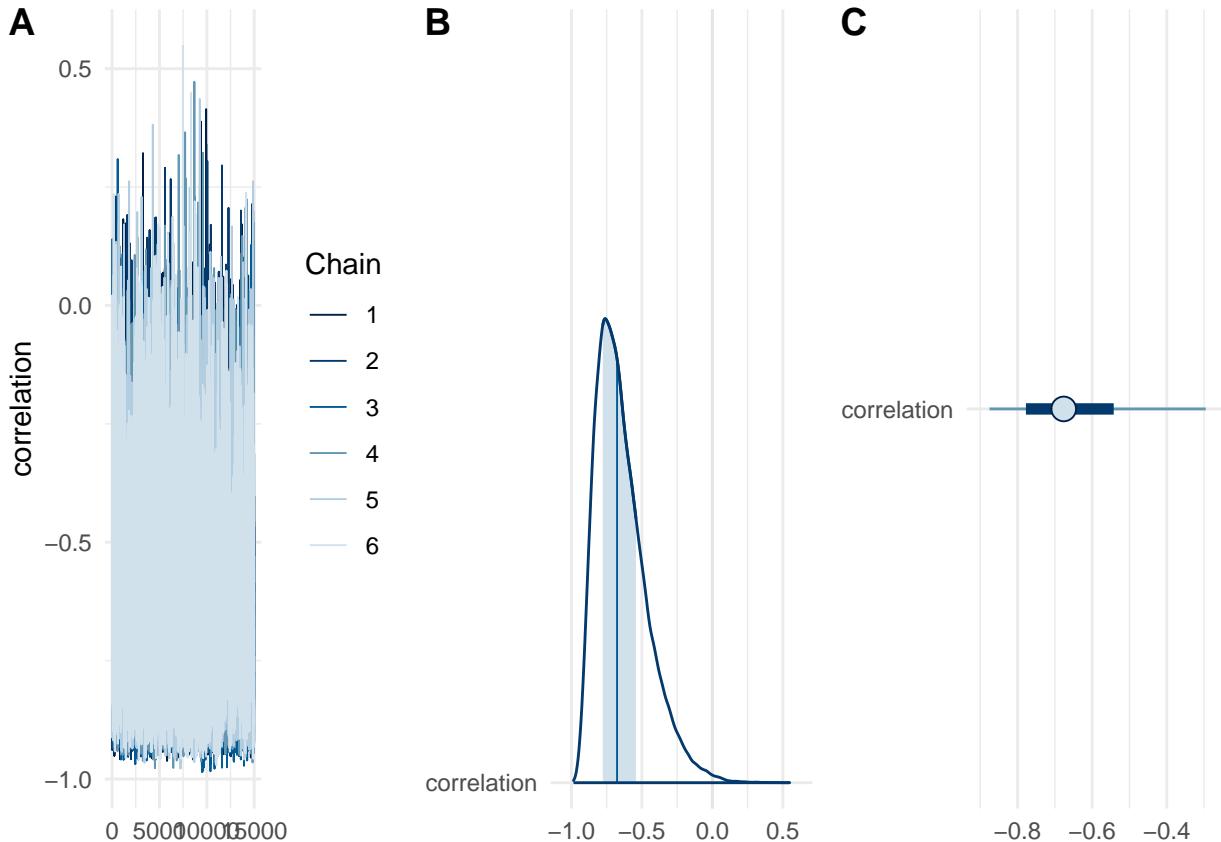
Model 10, prior set p3



## Correlation between germline and fission

This analysis was run to test for a phylogenetic association between early germline segregation and a strict bottleneck separating each generation. Prior set 4 above was used.

Figure: A shows the convergence of all chains, B and C both show the posterior estimates and confidence intervals for the correlation between the *absence* of a strict bottleneck, and the *presence* of early germline segregation. This is shown only for 1 chain.



For each chain, the posterior CI were as follows

```
## [[1]]
##           lower      upper
## correlation -0.9246633 -0.266606
## attr(),"Probability"
## [1] 0.95
##
## [[2]]
##           lower      upper
## correlation -0.9254954 -0.2633582
## attr(),"Probability"
## [1] 0.95
##
## [[3]]
##           lower      upper
## correlation -0.9456371 -0.3421168
## attr(),"Probability")
```

```
## [1] 0.95
##
## [[4]]
##           lower      upper
## correlation -0.9308132 -0.2855418
## attr(,"Probability")
## [1] 0.95
##
## [[5]]
##           lower      upper
## correlation -0.9343055 -0.2688037
## attr(,"Probability")
## [1] 0.95
##
## [[6]]
##           lower      upper
## correlation -0.9163333 -0.2686194
## attr(,"Probability")
## [1] 0.95
```