# Scenario 1

Inference validation

# Model A:
# sympatric speciation rate is diversity-dependent

- NO PARAMETER HAS BEEN FIXED
- Time has been fixed to T=8 for simulating and estimating parameters
- 10 simulated data have been generated
- Sample size per generation = 400
- Generations = 5
- q=0.5
- Maximum number of lineages = 150

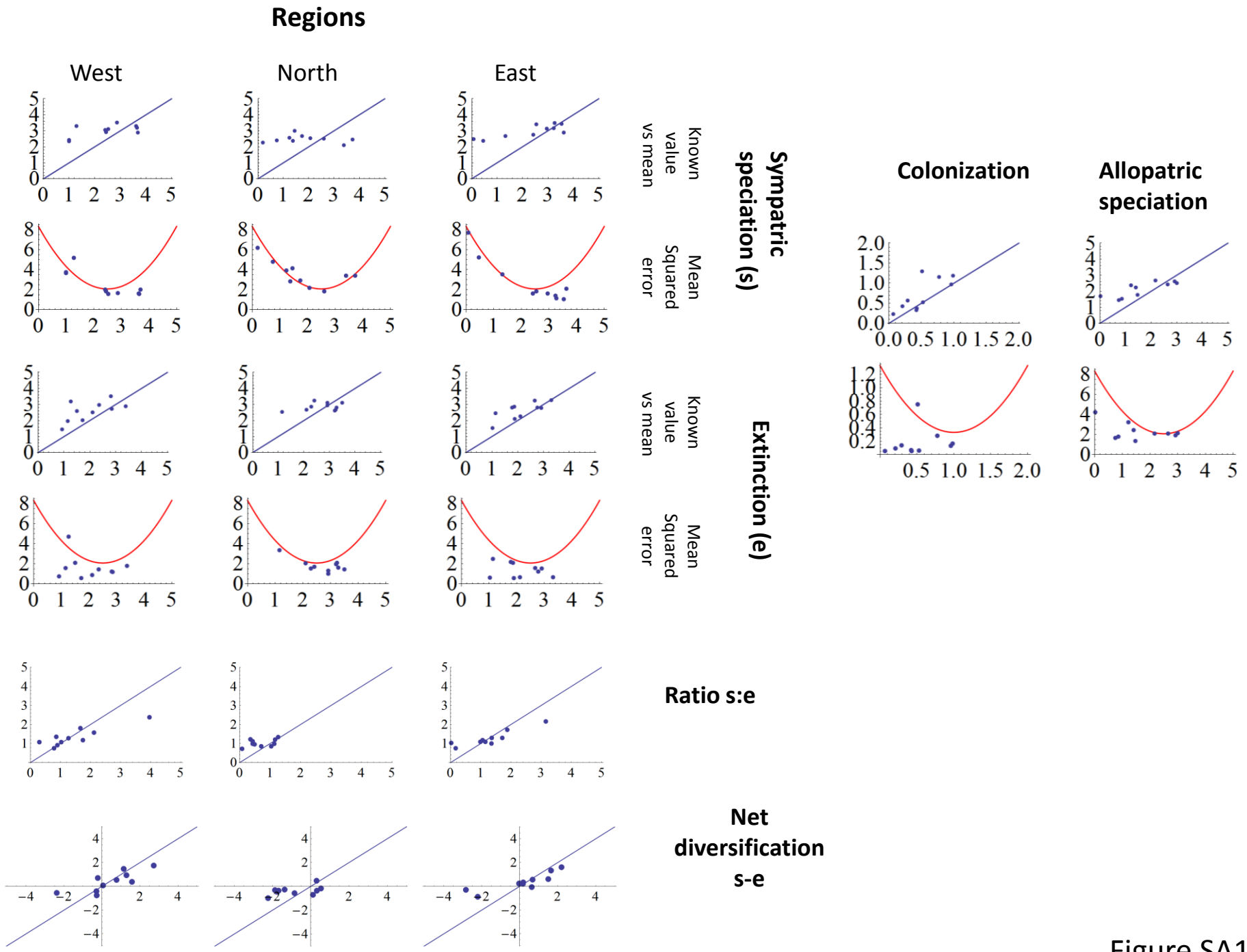

Regions
West
North
East
Known value vs mean
Mean Squared error
Known value vs mean
Mean Squared error
Sympatric speciation (s)
Extinction (e)
Colonization
Allopatric speciation
Ratio s:e
Net diversification s-e

Figure SA1

Distribution of correlation between sympatric speciation and extinction (S..._E...)

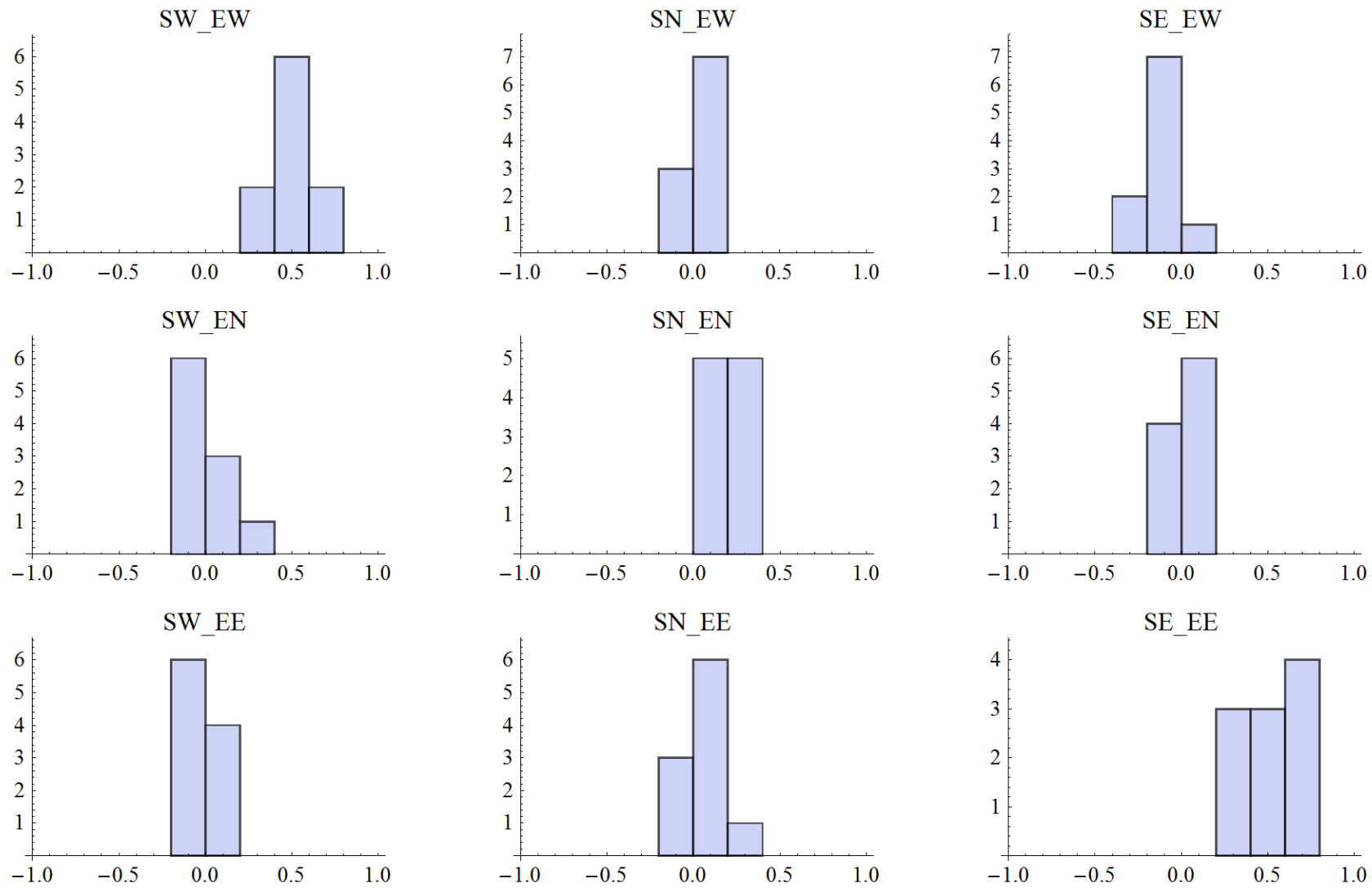



Figure SA2

Distribution of correlation between sympatric speciation (S…_S...), and between sympatric speciation and allopatric speciation (S..._A), and between extinction (E…_E…)

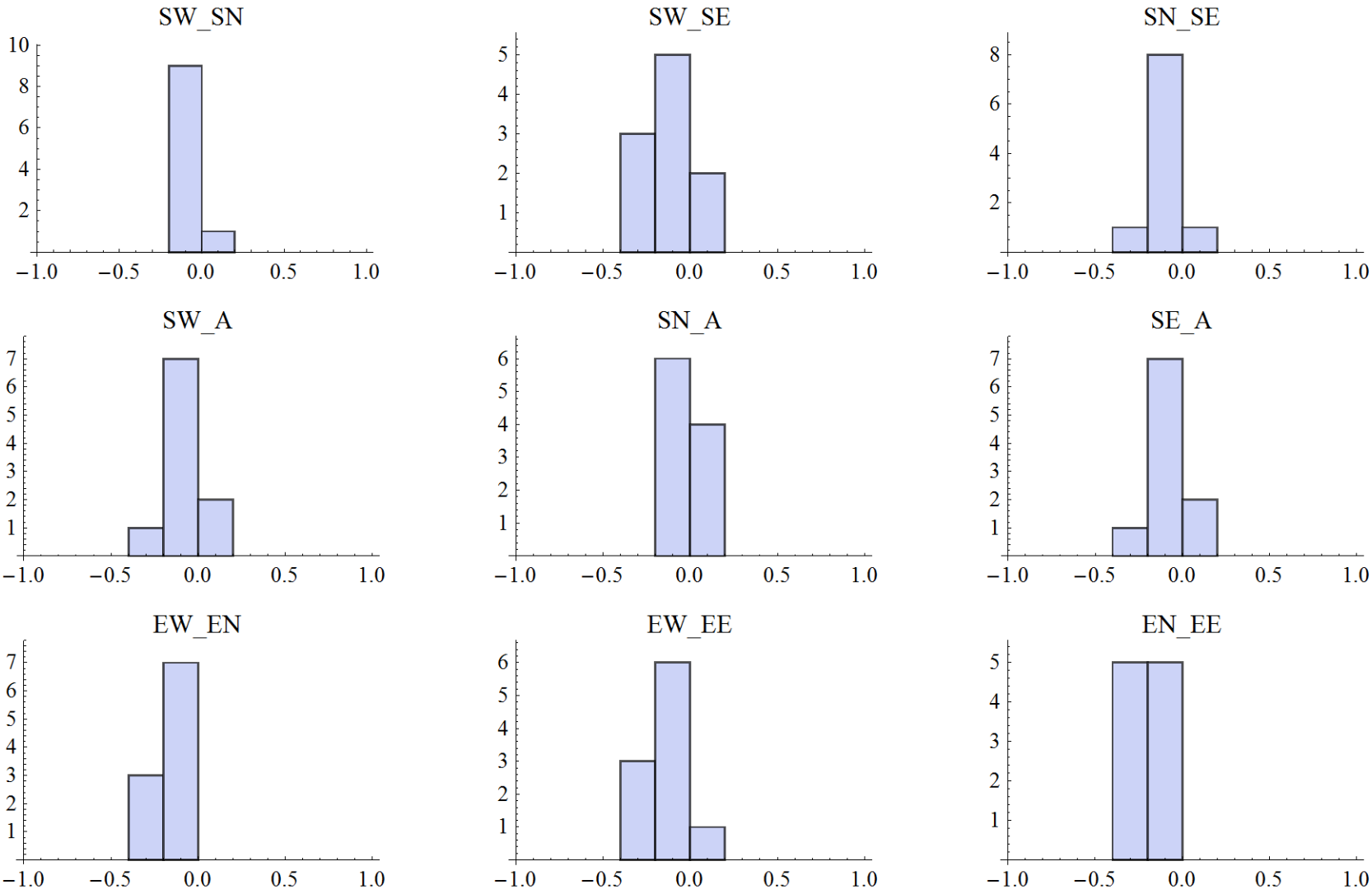



Figure SA3

Distribution of correlation between sympatric speciation and colonization (C_S...), and between colonization and extinction (C_E...)

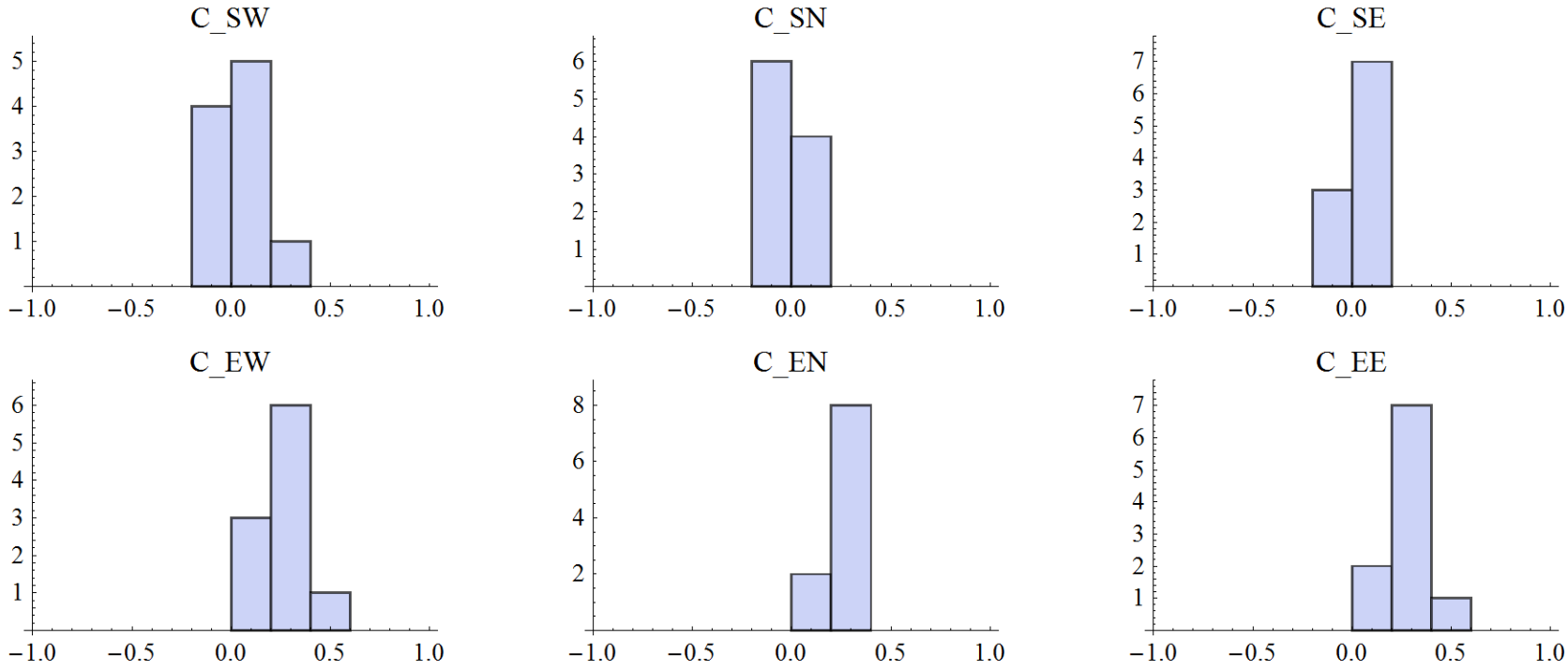



Figure SA4

Distribution of correlation between allopatric speciation and extinction (A_E...), and between allopatric speciation and colonization (C_E...)

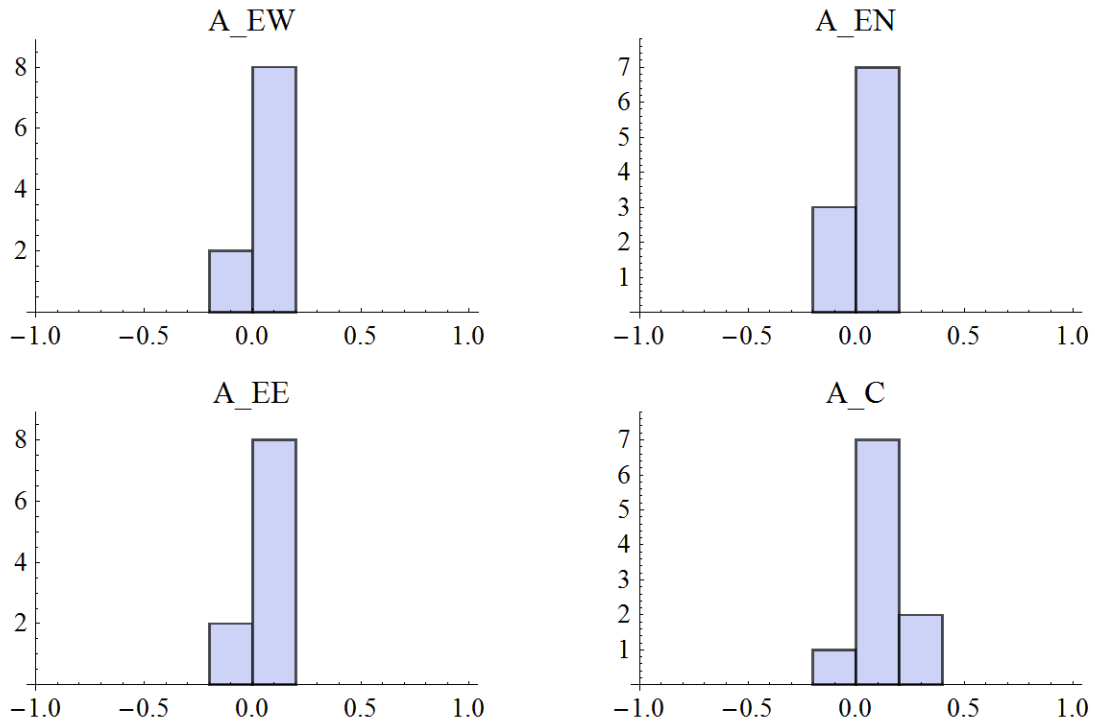



Figure SA5

# Scenario 1

Estimates from Empirical data

# Model A:
# sympatric speciation rate is diversity-dependent

- NO PARAMETER HAS BEEN FIXED
- Estimating parameters for empirical data
- T=8
- Sample size = 400
- q=0.5
- Number of generation = 7
- Maximum number of lineages = 150

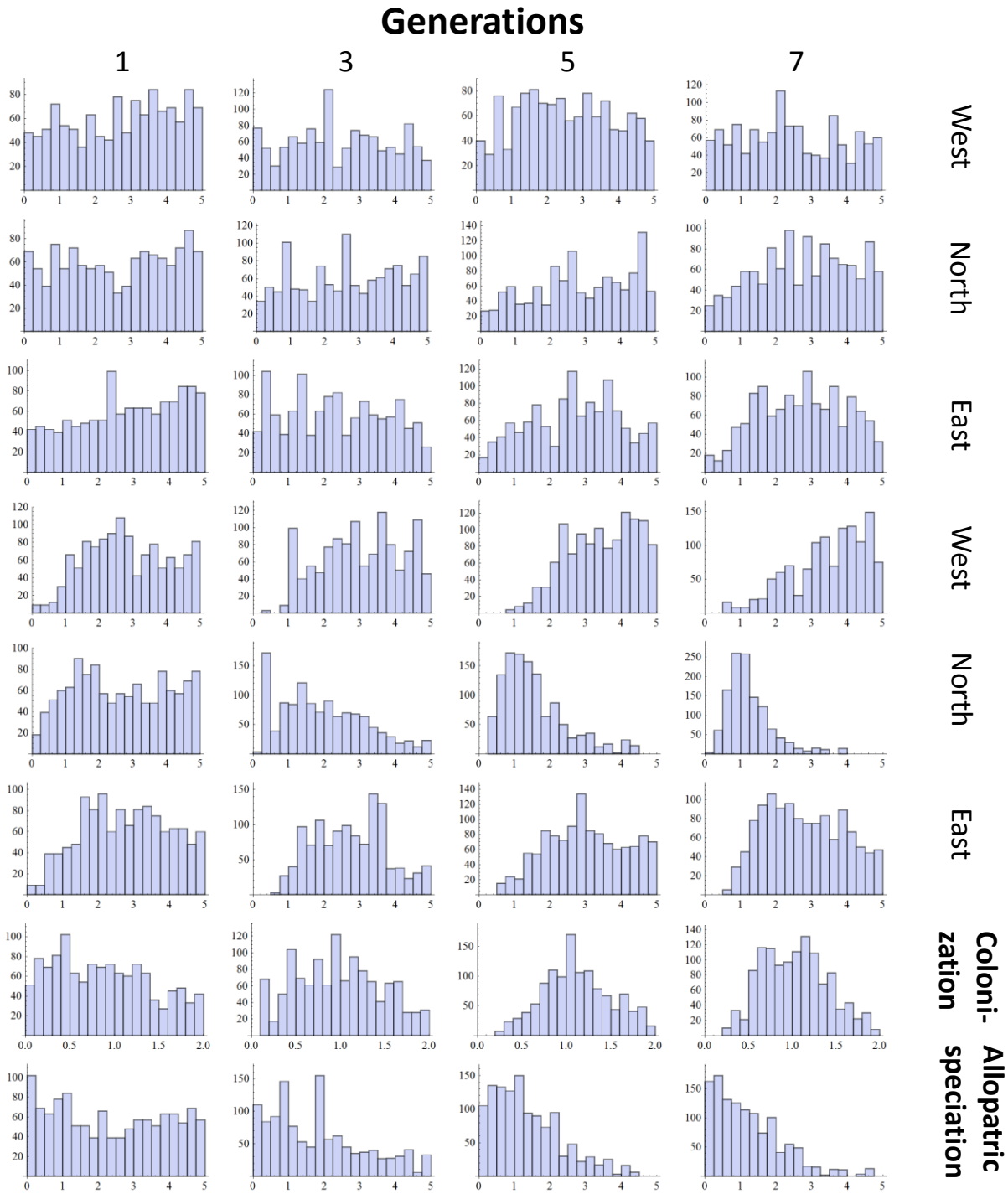

Generations
1
3
5
7
Sympatric speciation
West
North
East
Extinction
West
North
East
Coloni-zation
Allopatric speciation

Figure SA6

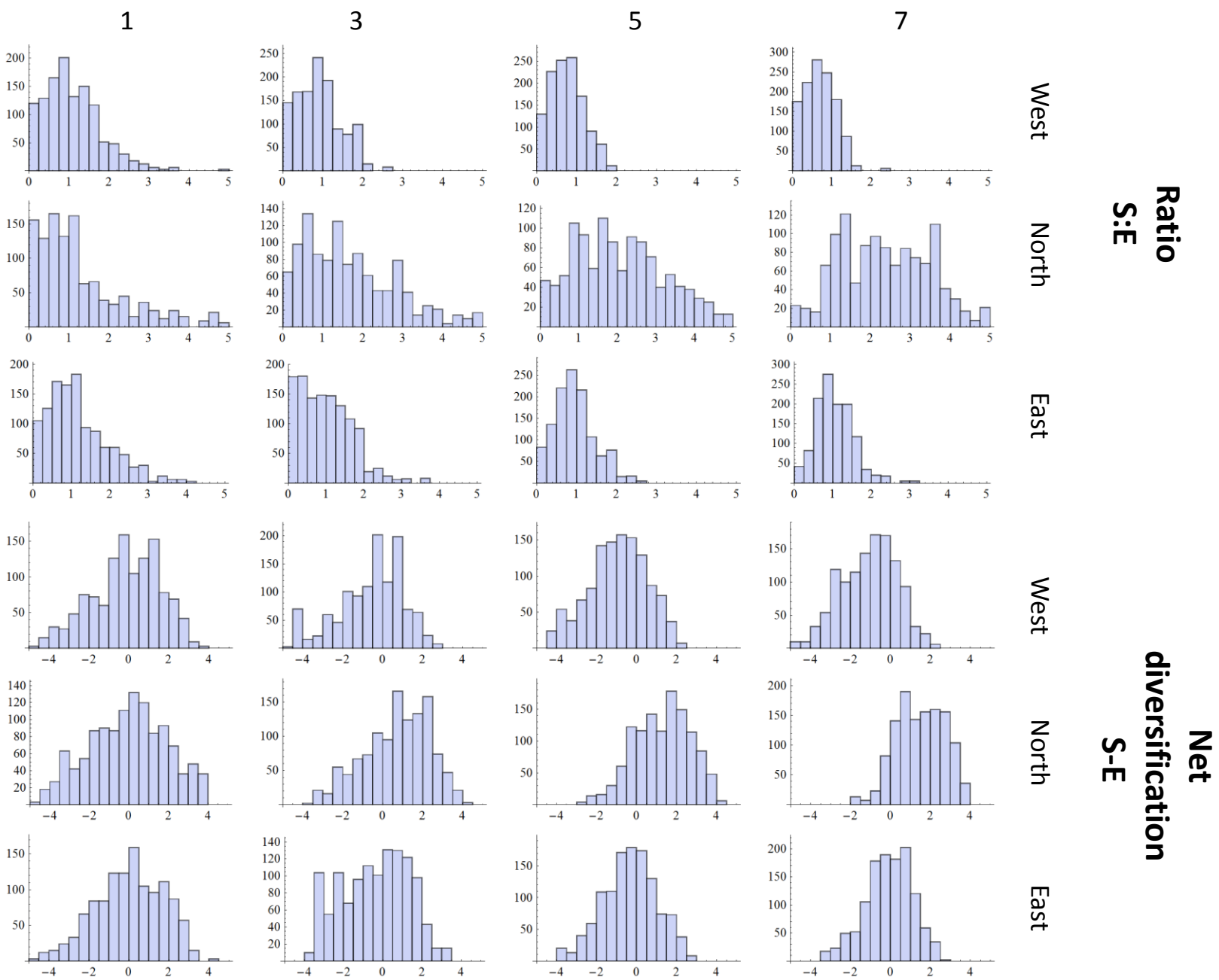

Generations
1
3
5
7
West
North
East
Ratio S:E
West
North
East
Net diversification S-E

Figure SA7

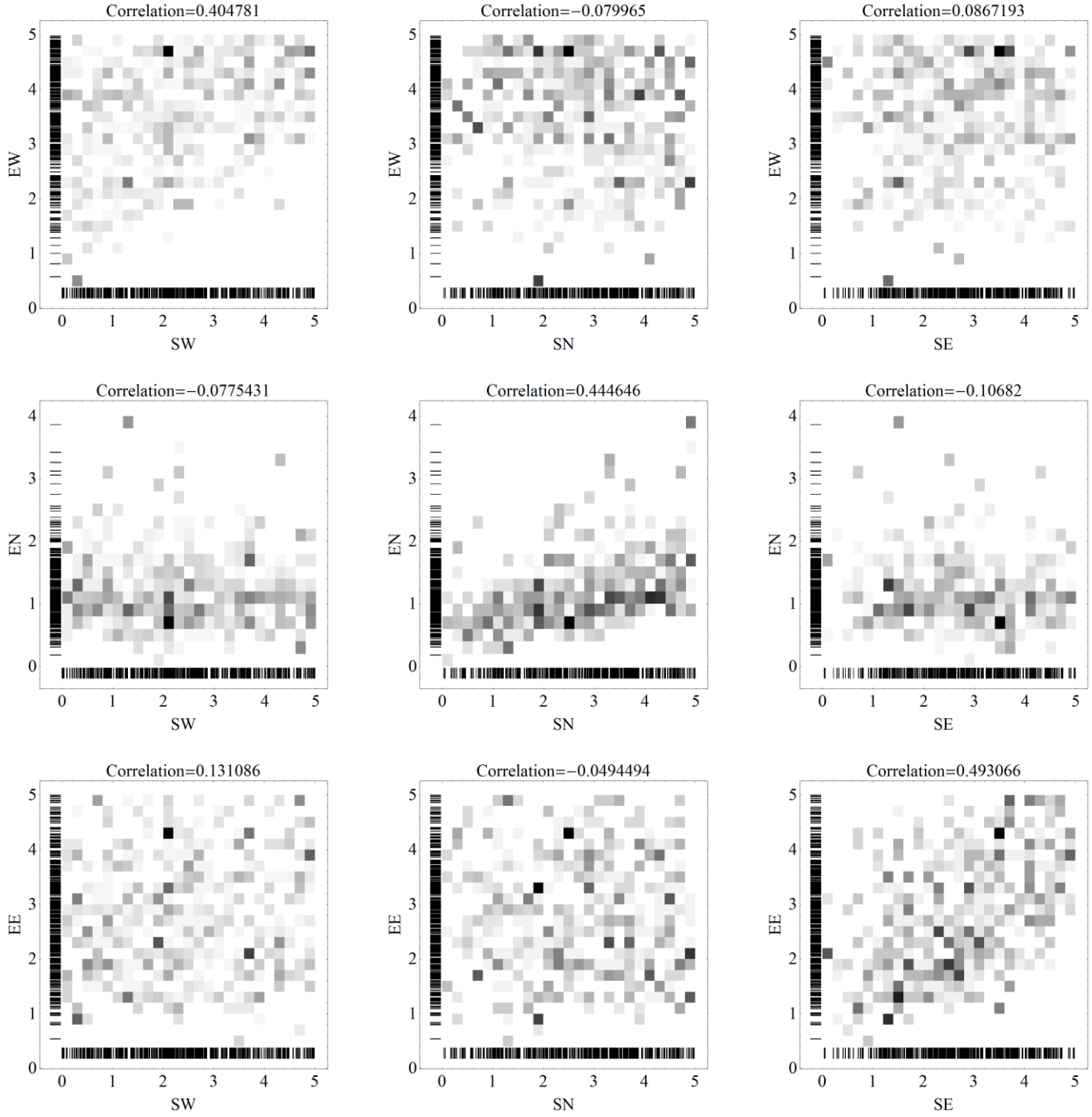

Correlation=0.404781
EW
SW
Correlation=−0.079965
EW
SN
Correlation=0.0867193
EW
SE
Correlation=−0.0775431
EN
SW
Correlation=0.444646
EN
SN
Correlation=−0.10682
EN
SE
Correlation=0.131086
EE
SW
Correlation=−0.0494494
EE
SN
Correlation=0.493066
EE
SE

Figure SA8

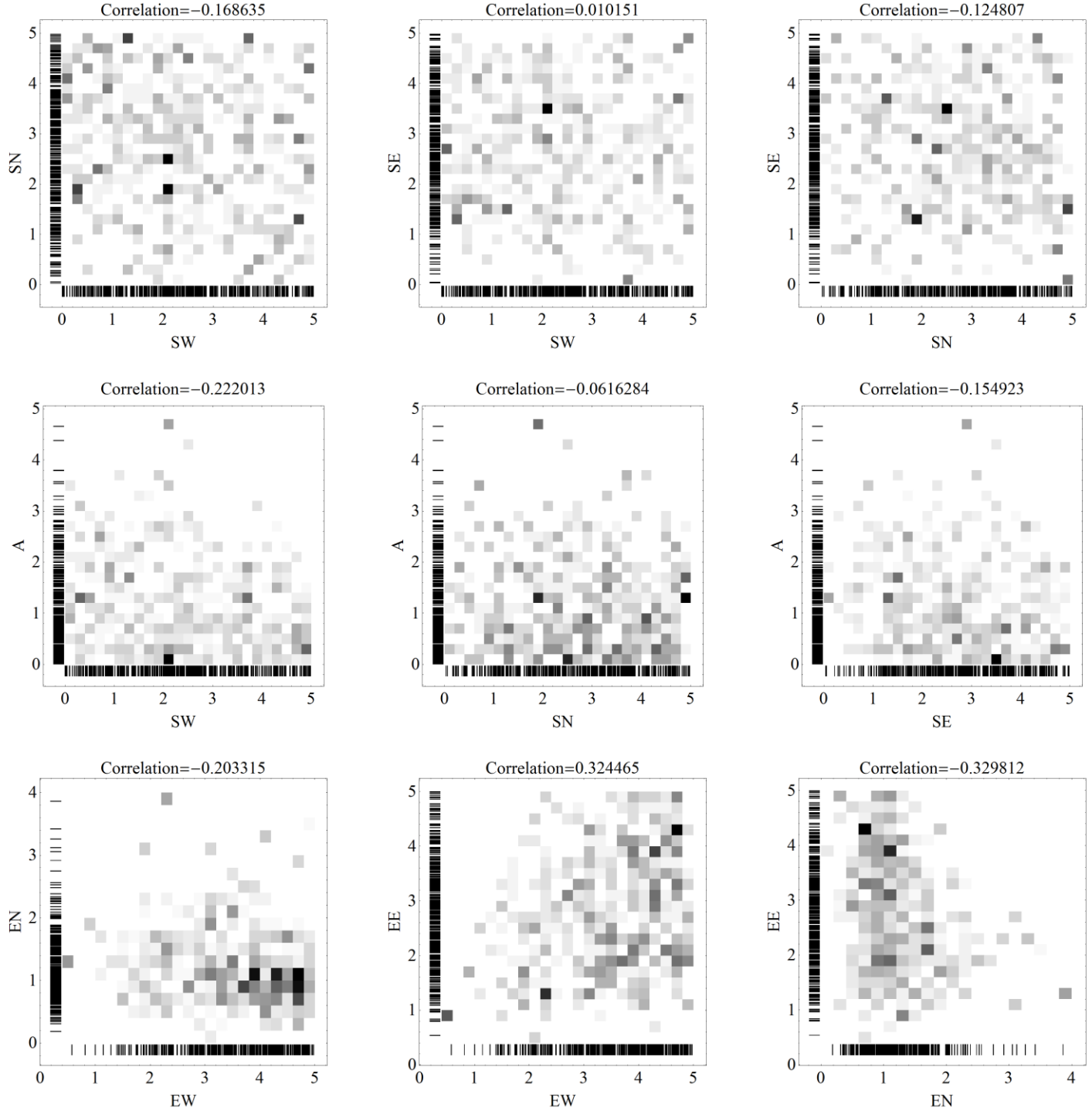

Correlation=−0.168635
SN
SW
Correlation=0.010151
SE
SW
Correlation=−0.124807
SE
SN
Correlation=−0.222013
A
SW
Correlation=−0.0616284
A
SN
Correlation=−0.154923
A
SE
Correlation=−0.203315
EN
EW
Correlation=0.324465
EE
EW
Correlation=−0.329812
EE
EN

Figure SA9

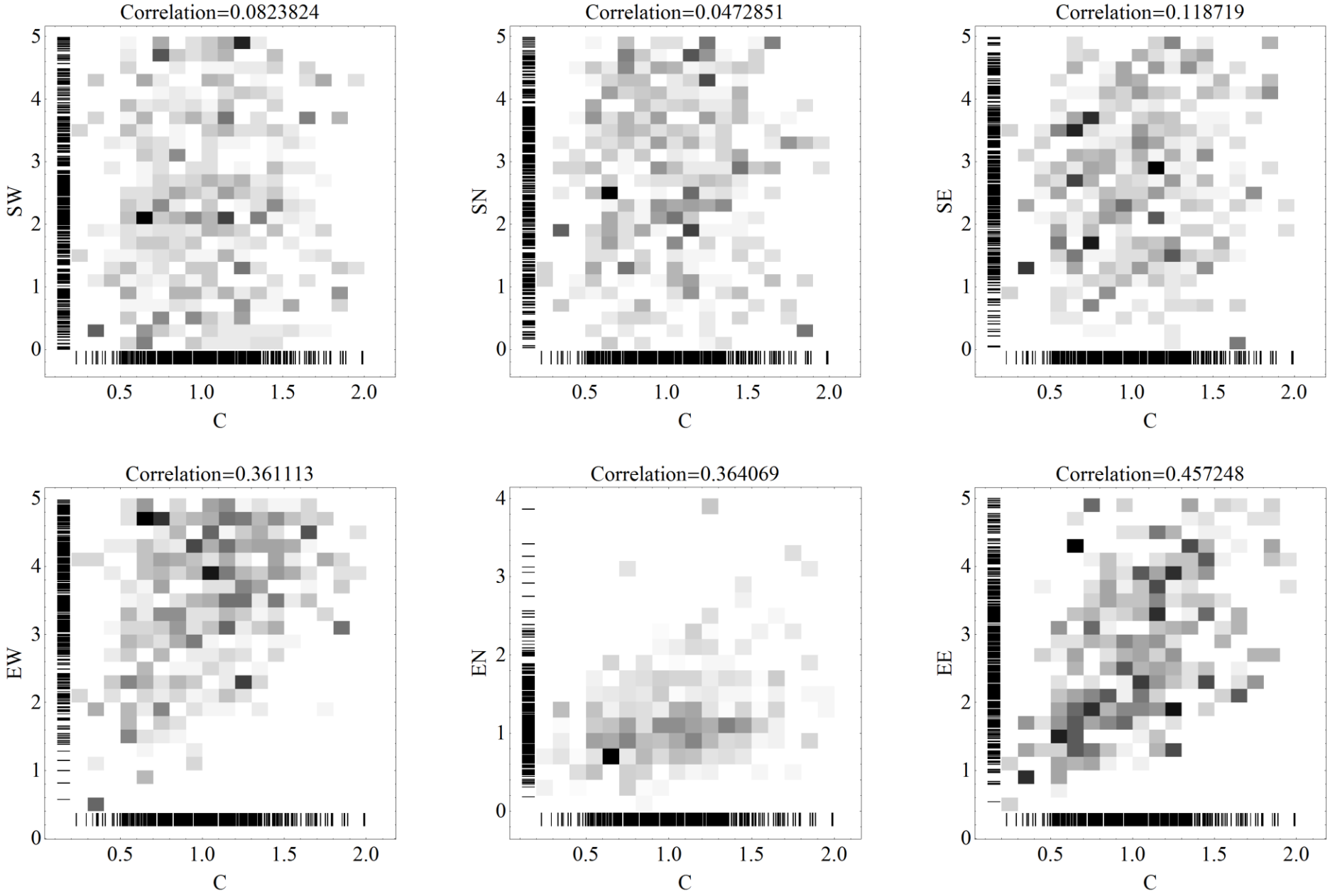
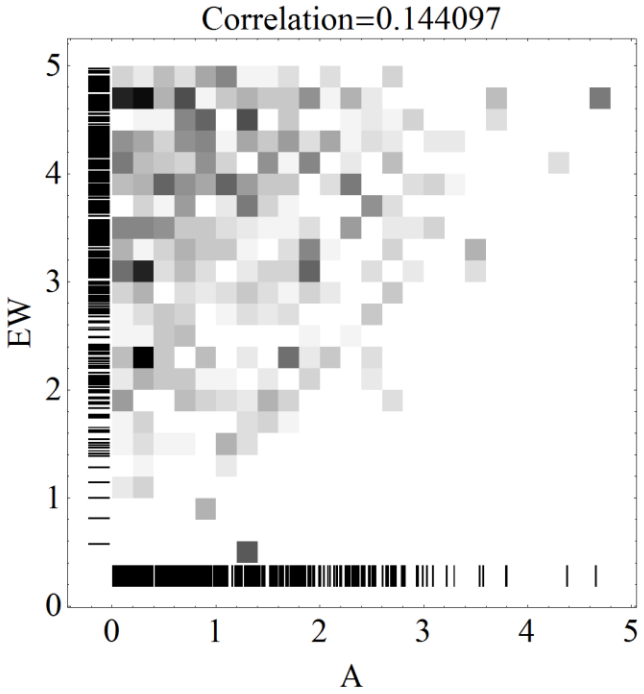
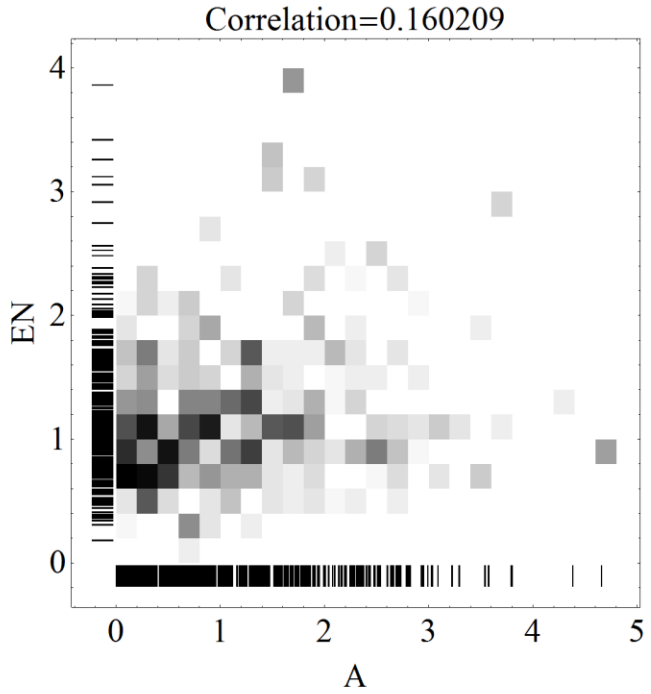
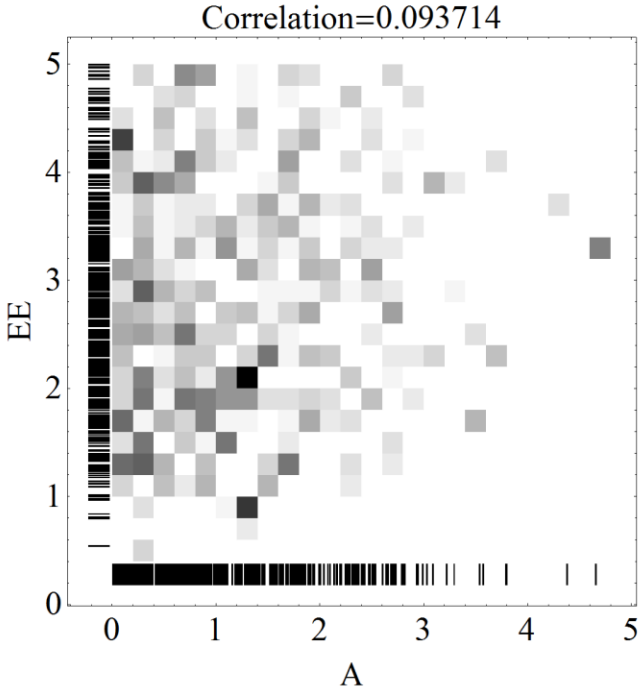

Correlation=0.0823824
SW
C
Correlation=0.0472851
SN
C
Correlation=0.118719
SE
C
Correlation=0.361113
EW
C
Correlation=0.364069
EN
C
Correlation=0.457248
EE
C

Figure SA10


Correlation=0.144097
EW
A
0
1
2
3
4
5


Correlation=0.160209
EN
A
0
1
2
3
4
5


Correlation=0.093714
EE
A
0
1
2
3
4
5

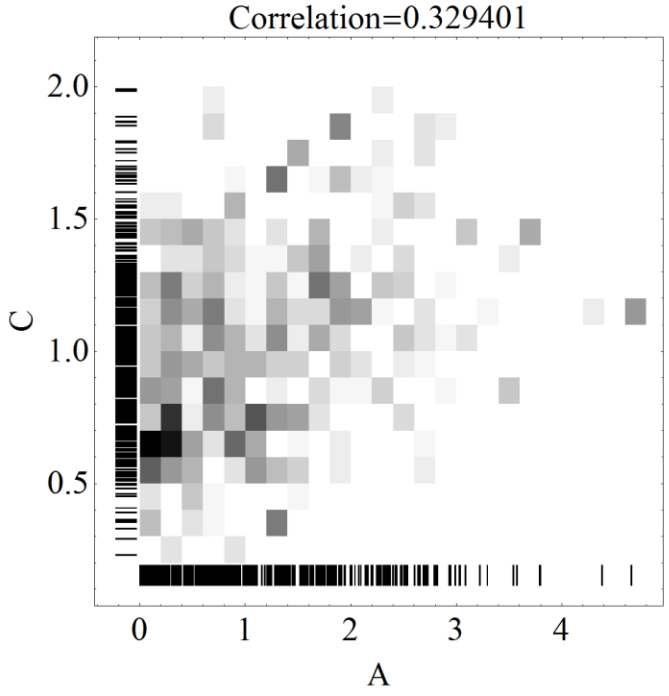

Correlation=0.329401
C
A
0.5
1.0
1.5
2.0
0
1
2
3
4

Figure SA11

# Scenario 1

Inference validation

# Model B:
# extinction rate is diversity-dependent

- NO PARAMETER HAS BEEN FIXED
- Time has been fixed to T=8 for simulating and estimating parameters
- 10 simulated data have been generated
- Sample size per generation = 400
- Generations = 5
- q=0.5
- Maximum number of lineages = 150

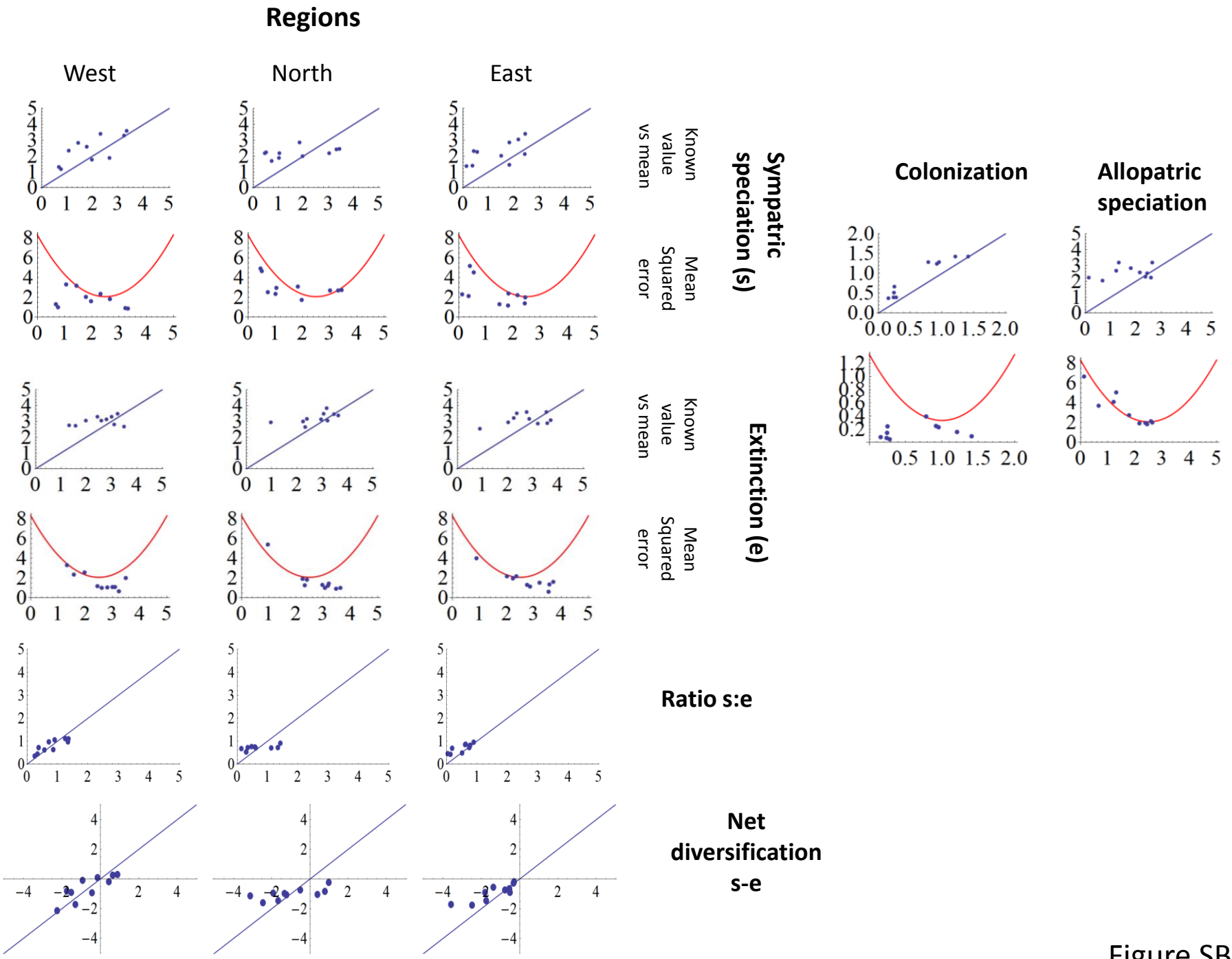

Regions
West
North
East
Known value vs mean
Mean Squared error
Sympatric speciation (s)
Known value vs mean
Mean Squared error
Extinction (e)
Ratio s:e
Net diversification s-e
Colonization
Allopatric speciation

Figure SB1

Distribution of correlation between sympatric speciation and extinction (S..._E...)

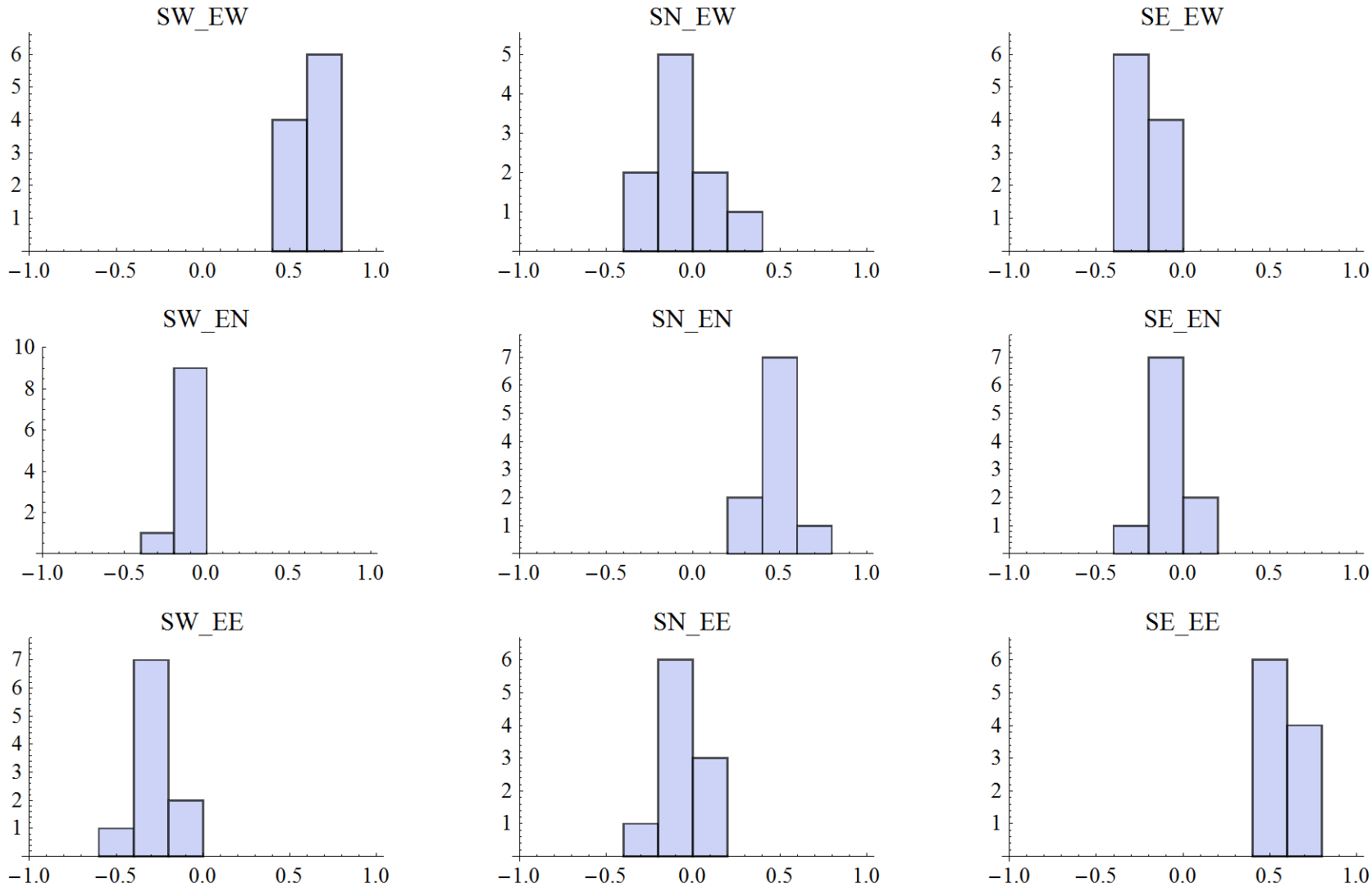



Figure SB2

Distribution of correlation between sympatric speciation (S…_S...), and between sympatric speciation and allopatric speciation (S..._A), and between extinction (E…_E…)

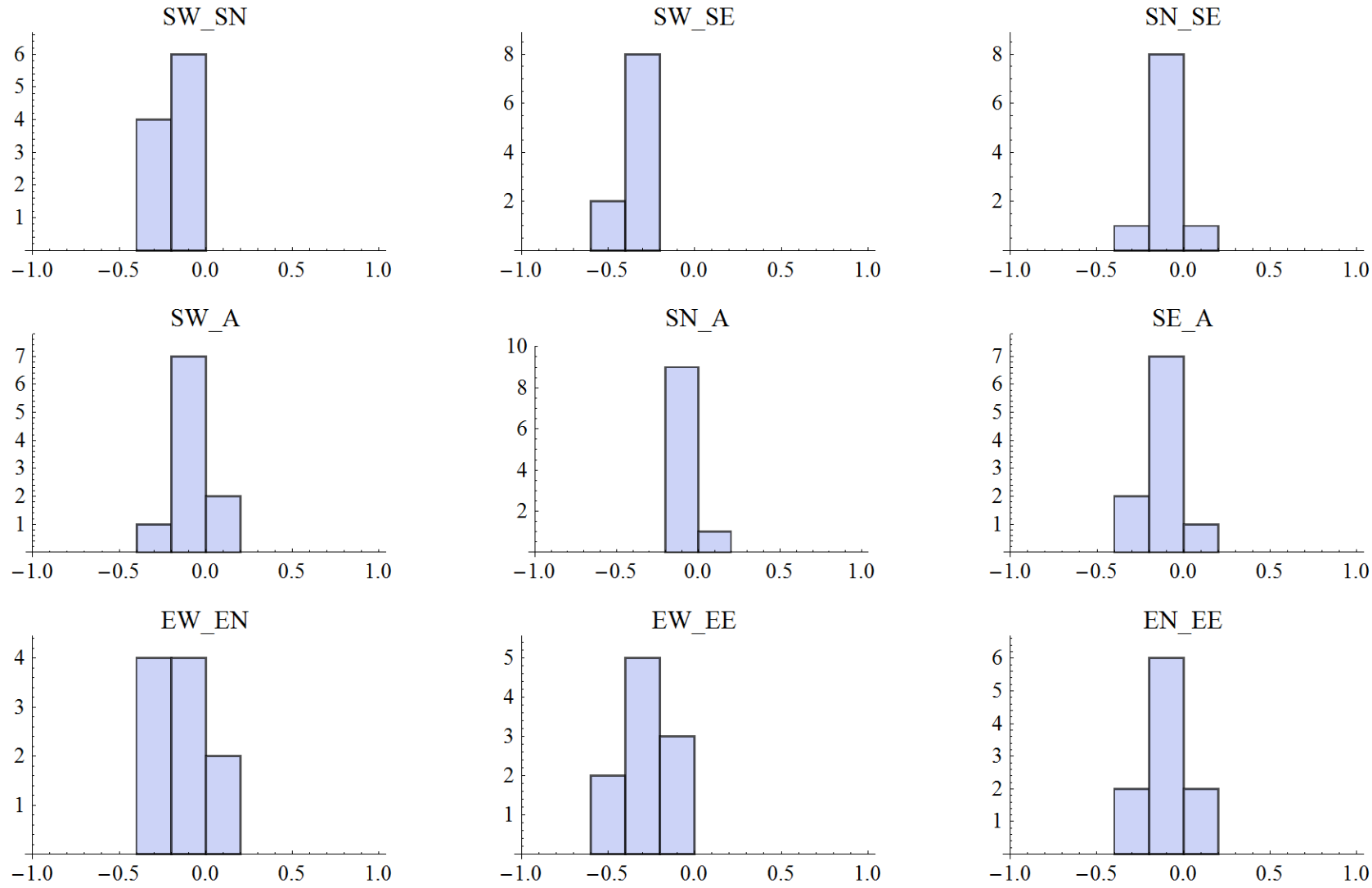



Figure SB3

Distribution of correlation between sympatric speciation and colonization (C_S...), and between colonization and extinction (C_E...)

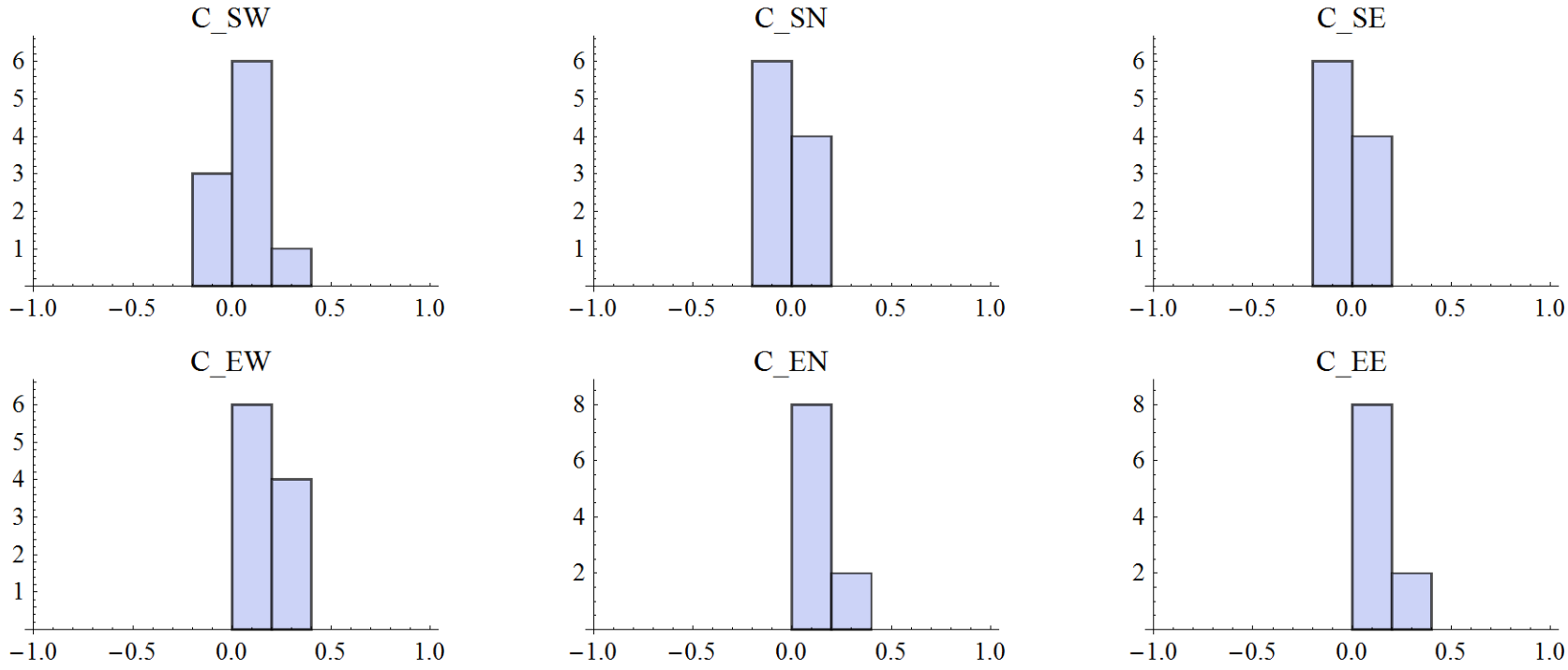



Figure SB4

Distribution of correlation between allopatric speciation and extinction (A_E...), and between allopatric speciation and colonization (C_E...)

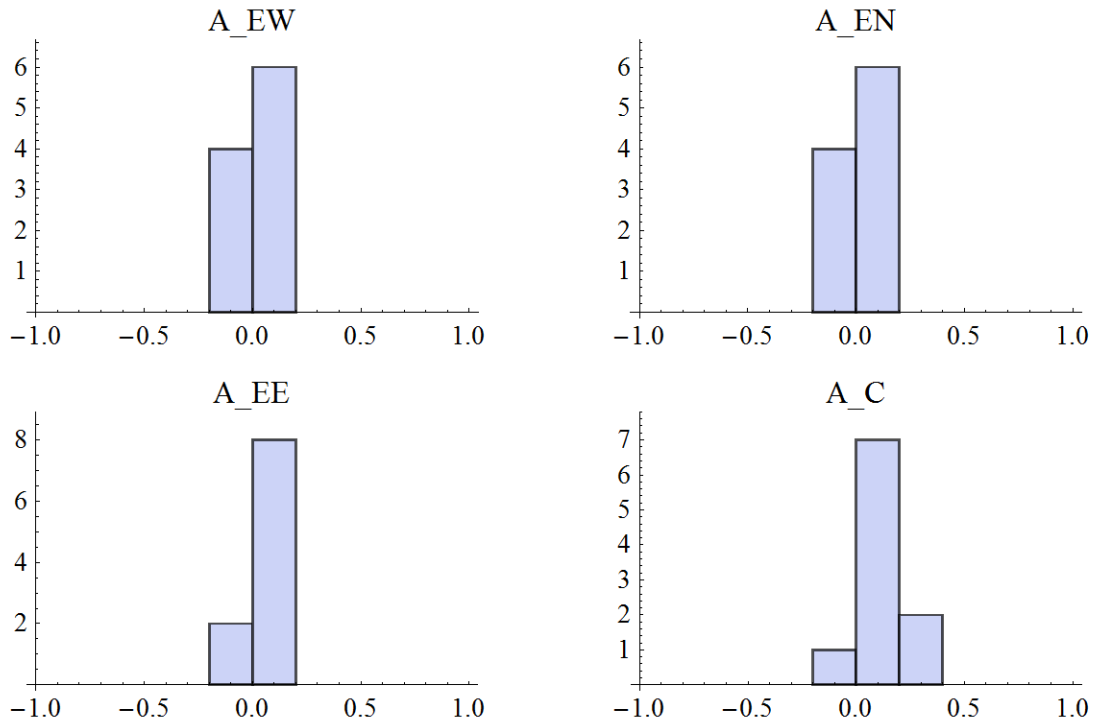



Figure SB5

# Scenarion 1

Estimates from Empirical data

# Model B:
# extinction rate is diversity-dependent

- NO PARAMETER HAS BEEN FIXED
- Estimating parameters for empirical data
- T=8
- Sample size = 400
- q=0.5
- Number of generation = 7
- Maximum number of lineages = 150

Generations
1
3
5
7
Sympatric speciation
West
North
East
Extinction
West
North
East
Coloni-zation
Allopatric speciation

Figure SB6

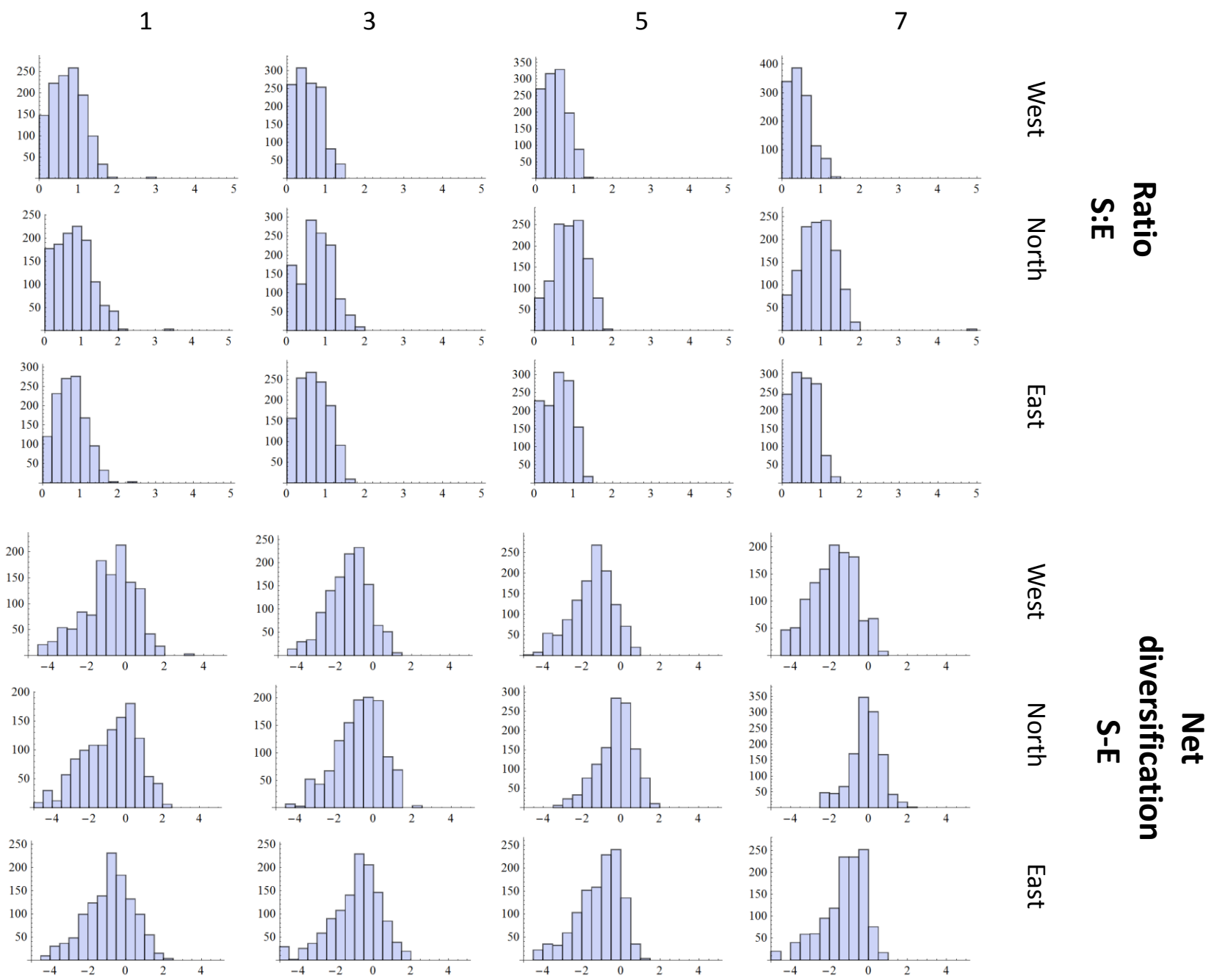

Generations
1
3
5
7
West
North
East
Ratio S:E
West
North
East
Net diversification S-E

Figure SB7

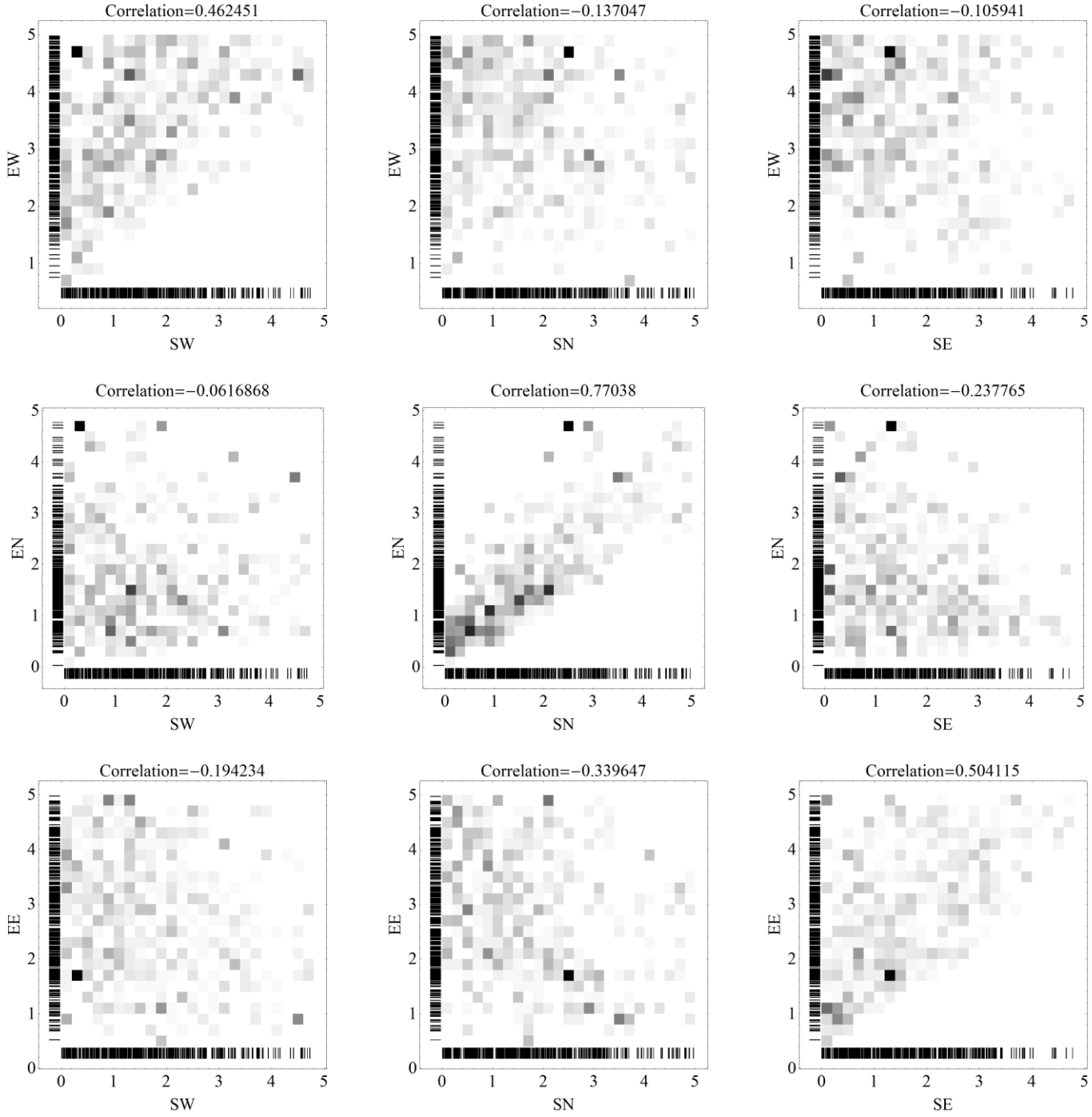

Correlation=0.462451
EW
SW
Correlation=−0.137047
EW
SN
Correlation=−0.105941
EW
SE
Correlation=−0.0616868
EN
SW
Correlation=0.77038
EN
SN
Correlation=−0.237765
EN
SE
Correlation=−0.194234
EE
SW
Correlation=−0.339647
EE
SN
Correlation=0.504115
EE
SE

Figure SB8

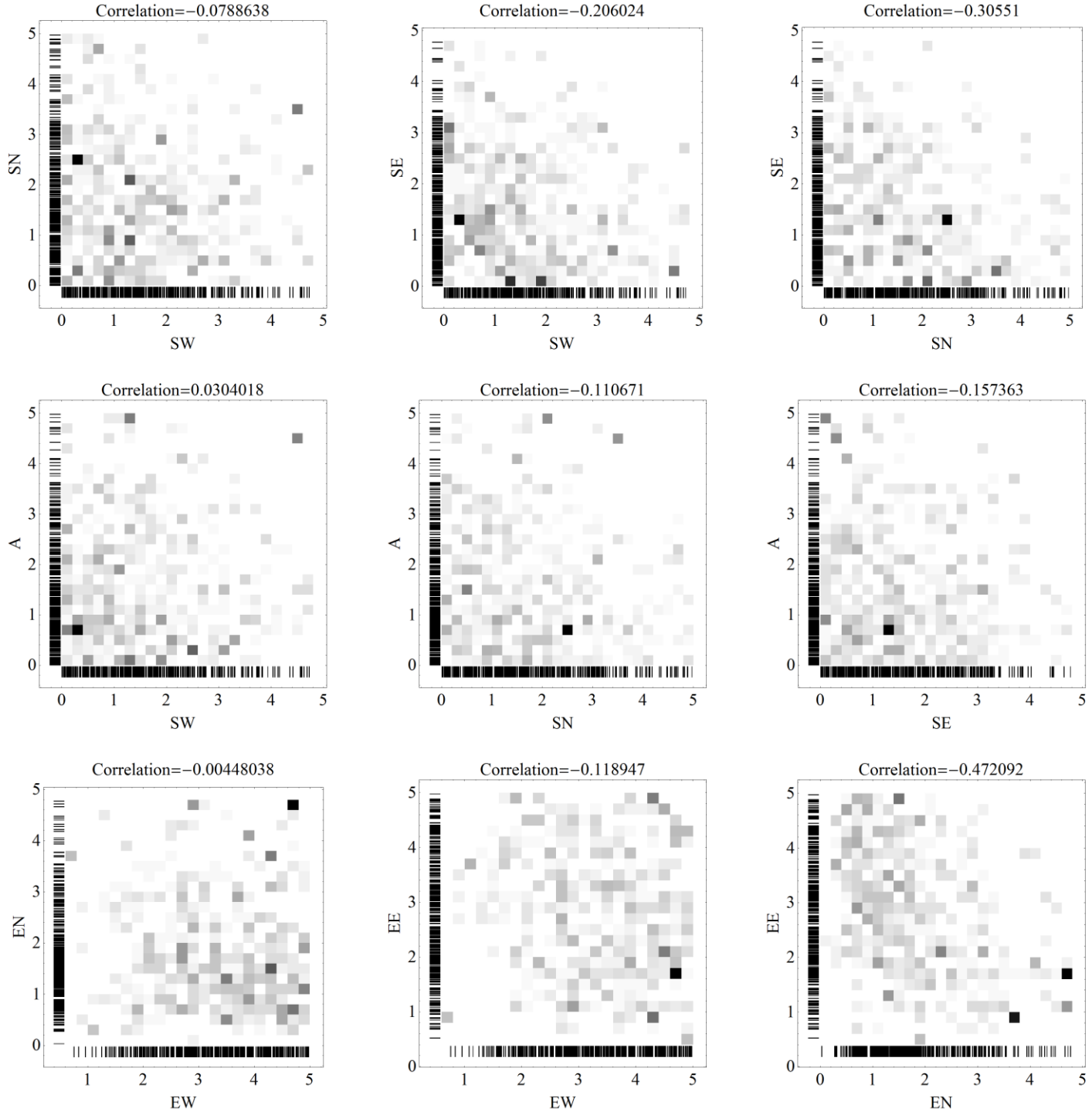

Correlation=−0.0788638
SN
SW
Correlation=−0.206024
SE
SW
Correlation=−0.30551
SE
SN
Correlation=0.0304018
A
SW
Correlation=−0.110671
A
SN
Correlation=−0.157363
A
SE
Correlation=−0.00448038
EN
EW
Correlation=−0.118947
EE
EW
Correlation=−0.472092
EE
EN

Figure SB9

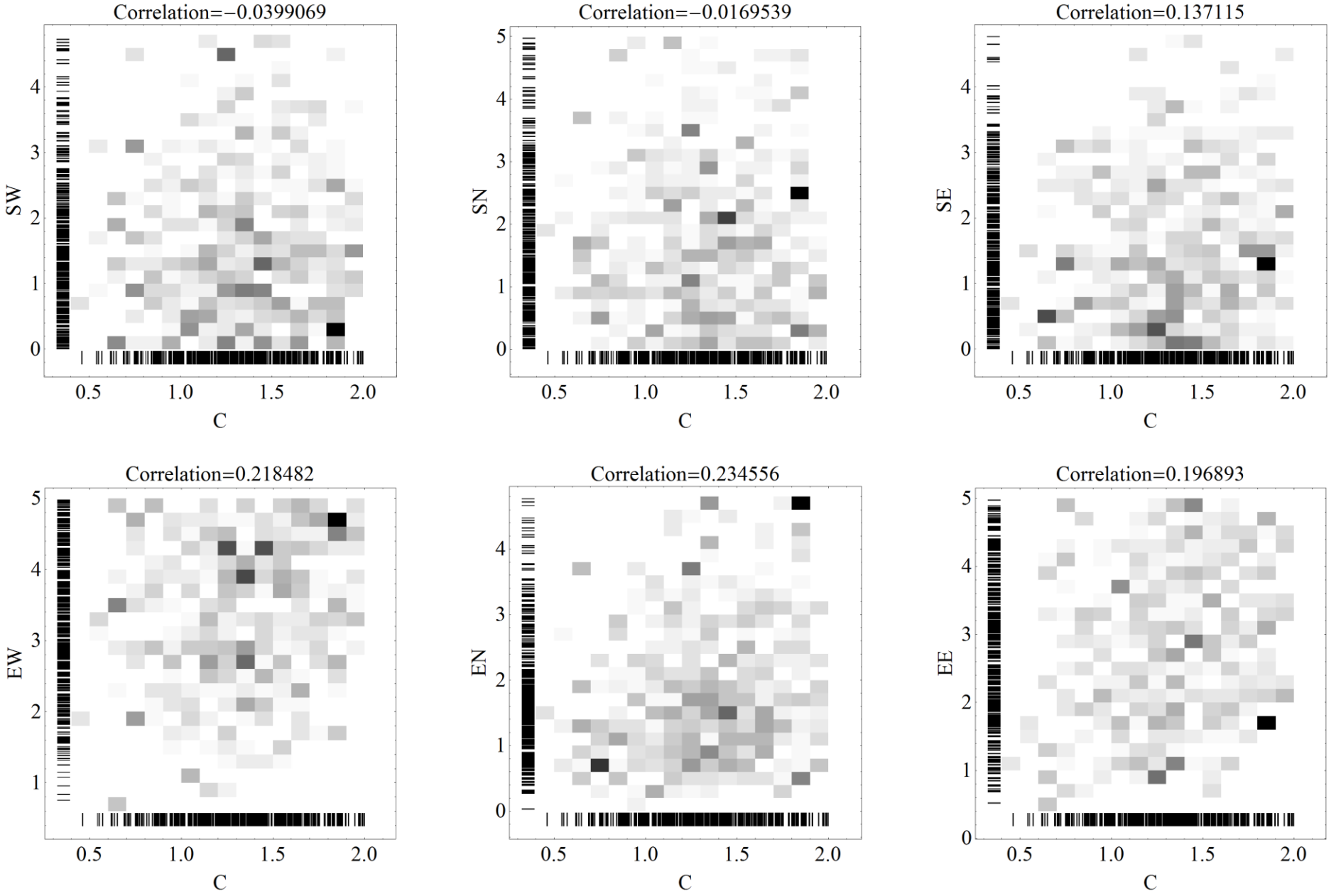

Correlation=−0.0399069
SW
C
Correlation=−0.0169539
SN
C
Correlation=0.137115
SE
C
Correlation=0.218482
EW
C
Correlation=0.234556
EN
C
Correlation=0.196893
EE
C

Figure SB10

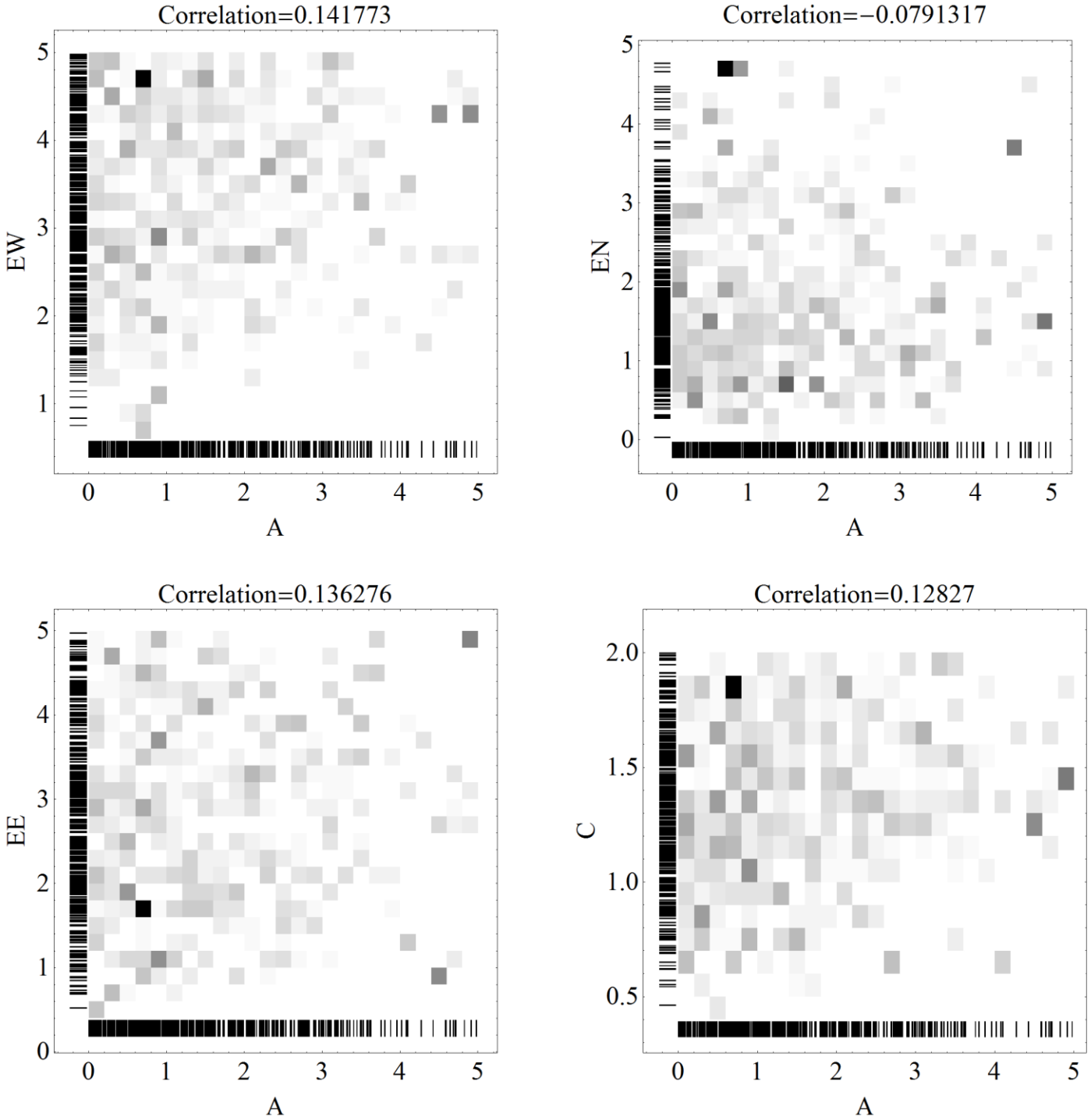

Correlation=0.141773
EW
A
Correlation=−0.0791317
EN
A
Correlation=0.136276
EE
A
Correlation=0.12827
C
A

Figure SB11