Model	Marginal log-likelihood	M2	M3	M4	M5	Evidence
M1. D/P	-1283.76	59.90	49.23	60.48	58.82	Every model strongly preferred over M1
M2. CID D/P	**-1223.86**		-10.66	0.579	-1.079	Strong preference for M2 over M1
M3. D/P+A/B	-1234.52			11.24	9.58	Asymmetric rates strongly preferred over symmetric
M4. D/P+A/B asym	**-1223.28**				-1.658	Moderate evidence for only asymmetric hidden rates
M5. D/P+A/B all asym	-1224.93					

Table 1: Bayes factors of ploidy only models without diplodization. Results indicate that a character independent model (M2) is strongly preferred over BiSSE (M1) model. There is no evidence that character independent model is different from M4, the HiSSE model with asymmetric hidden rates. M4 is moderately preferred over the more complicated M5, a HiSSE model that has asymmetry for all transition rates.

Model	Marginal log-likelihood	M7	M8	M9	M10	Evidence
M6. D/P+δ	-1268.83	55.41	42.78	53.37	52.85	Every model strongly preferred over M6
M7. CID D/P+δ	**-1212.42**		-12.62	-2.04	-2.04	Model M7 moderately preferred over M9 and M10
M8. D/P+A/B δ	-1214.46			10.58	10.07	Asymmetric rates strongly preferred over symmetric
M9. D/P+A/B +δ asym	-1214.46				-0.51	No evidence
M10. D/P+A/B +δ all asym	-1214.97					

Table 2: Bayes factors of ploidy only models with diplodization. Results indicate that a character independent model (M6) is strongly preferred over BiSSE (M1) model. M6 is moderately preferred over any of the HiSSE model swith asymmetric hidden rates (M9, M10).

Model	Marginal log-likelihood	M12	M13	M14	M15	Evidence
M11. I/C	-1309.07	41.13	38.59	61.34	61.40	Every model strongly preferred over M111
M12. CID I/C	-1267.93		-2.53	20.21	20.37	Models with asymmetric rates are preferred over M12
M13. I/C+A/B	-1270.47			22.75	22.80	Asymmetric rates strongly preferred over symmetric
M14. I/C+A/B asym	**-1247.72**				0.05	No evidence
M15. I/C+A/B all asym	**-1247.66**					

Table 3: Bayes factors of breeding system only models. Results indicate that the HiSSE models with asymmetric rates (M14, M15) are strongly preferred over every other model.

Model	Marginal log-likelihood	M18	M19	M20	Evidence
M16. ID/CP/CD	-1459.11	45.11	65.91	63.98	Every model strongly preferred over M16
M17. CID ID/CP/CD	*				
M18. ID/CP/CD+A/B	-1414		20.79	18.87	Asymmetric rates strongly preferred over symmetric
M19. ID/CP/CD +A/B asym	**-1393.20**			-1.92	Asymmetric hidden rates moderately preferred over all asymmetric
M20. ID/CP/CD +A/B all asym	-1393.12				

Table 4: Bayes factors of ploidy and breeding system withou diploidization. Results indicate that the MuHiSSE model with asymmetric hidden rates (17) is strongly preferred over M16 and M18 and moderately preferred over the MuHiSSe with all rates asymetric (M20). *Marginal log-likelihood for M17 could not be calculated in our limited amount of computational time.

Model	Marginal log-likelihood	M22	M23	M24	M25	Evidence
M21. ID/CP/CD+δ	-1454.68	55.48	46.031	67.94	65.15	Every model strongly preferred over M21
M22. CID ID/CP/CD+δ	-1399.201		-9.452	12.45	9.675	Model M24 strongly preferred over M22
M23. ID/CP/CD+A/B δ	-1408.65			21.91	19.12	Asymmetric rates strongly preferred over symmetric
M24. ID/CP/CD +δ asym	**-1386.74**				-2.78	Asymmetric hidden rates preferred over all asymmetric
M25. ID/CP/CD +δ all asym	-1389.52					

Table 5: Bayes factors of ploidy and breeding system with diploidization. Results indicate that the MuHiSSE model with asymmetric hidden rates (M24) is strongly preferred over M21-M23 and moderately preferred over the MuHiSSe with all rates asymetric (M25).

Model	Marginal log-likelihood	Comparison	K=log(BF(M1,M2))	Preferred Model (Evidence)
M3. D/P+A/B	-1234.52	M3 vs. M4	11.239	M4 (Strong)
M4. D/P+ A/B asym	-1223.28	M4 vs. M5	-1.658	M4 (Moderate)
M5. D/P+A/B all asym	-1224.93			
M13. I/C+ A/B	-1270.47	M13 vs. M14	22.75	M14 (Strong)
M14. I/C+ A/B asym	**-1247.72**	M14 vs. M15	0.05	No evidence
M15. I/C+ A/B all asym	-1247.67			
M18. IC/CD/CP+A/B	-1414.00	M18 vs. M19	20.79	M19 (Strong)
M19. IC/CD/CP+ A/B asym	**-1393.21**	M19 vs. M20	-1.919	M19 (Moderate)
M20. IC/CD/CP+ A/B all asym	-1395.129			
M8. D/P +A/B+δ	-1225.05	M8 vs. M9	10.58	M9 (Strong)
M9. D/P+ A/B+ δ asym	**-1214.46**	M9 vs. M10	-0.52	M10 (Moderate)
M10. D/P+A/B+δ all asym	-1214.98			
M23. IC/CD/DP+A/B+δ	-1408.65	M23 vs M24	21.91	M24(Strong)
M24. IC/CD/DP+A/B+δ asym	**-1386.74**	M24 vs M25	-2.78	M24 (Moderate)
M25. IC/CD/DP+A/B+ δ all asym	-1389.52			

Table 6: Test for symmetry of the hidden and trait rates via Bayes factors. For all models asymmetric hidden transition rates are preferred over models with equal hidden rates. Adding more complexity by assuming asymmetry in the trait rate within hidden states does not improve models.

Model	Marginal log-likelihood	Comparison	K=log(BF(M1,M2)	Preferred Model (Evidence)
M1. D/P **M4. D/P+A/B asym**	-1238.76 **-1223.28**	M1 vs. M4	60.47	M4 (Strong)
M11. I/C **M14. I/C+A/B asym**	-1309.07 **-1247.72**	M11 vs. M14	61.35	M14 (Strong)
M16. ID/CD/CP **M19. ID/CD/CP+A/B asym**	-1459.11 **-1393.20**	M16 vs. M19	65.90	M19 (Strong)
M6. D/P+δ **M9. D/P+A/B+δ asym**	-1283.76 **-1214.46**	M6 vs. M9	69.3	M9 (Strong)
M21. IC/CD/CP+δ **M24. IC/CD/CP+A/B+δ asym**	-1454.68 **-1386.20**	M21 vs. M24	68.48	M24 (Strong)

Table 7: Test for addition of hidden states in models via Bayes factors. Models with hidden states are strongly preferred over simpler models

Model	Marginal log-likelihood	Comparison	K=log(BF(M1,M2)	Preferred Model (Evidence)
M1. D/P **M6. D/P+δ**	-1238.76 **-1267.84**	M1 vs. M6	65.92	M6 (Strong)
M4. D/P+A/B asym **M9. D/P+A/B+δ asym**	-1223.28 **-1214.46**	M4 vs. M9	8.81	M9 (Moderate)
M16. ID/CD/CP **M21. ID/CD/CP+δ**	-1459.11 **-1454.68**	M16 vs. M21	4.41	M21 (Moderate)
M19. IC/CD/CP asym **M24. IC/CD/CP+A/B+δ asym**	-1393.20 **-1386.20**	M19 vs. M24	6.46	M24 (Moderate)

Table 8: Test for inclusion of a diploidization rate via Bayes factors. Models with diploidzation are moderately preferred over models that do not include a diploidization rate

Model	Marginal log-likelihood	Comparison	K=ln(BF(M1,M2))	Preferred Model (Evidence)
M26. Lumped D/P **M16. ID/CD/CP**	-1463.22 **-1459.11**	M26 vs. M16	4.10	M16 (Moderate)
M27. Lumped D/P+A/B **M23. ID/CD/CP +A/B**	-1417.67 **-1414.00**	M27 vs. M23	3.678	M23 (Moderate)
M28. Lumped I/C **M16. ID/CD/CP**	-1458.41 **-1459.11**	M28 vs. M16	-0.69	No evidence
M29. Lumped I/C+ A/B **M23. IC/CD/CP+A/B**	-1416.60 **-1414.00**	M29 vs. M23	2.60	M23 (Moderate)

Table 9: Test for adding a focal trait to a binary state model via Bayes factors. Three-state modes are moderately preferred over two-state models. The evidence is stronger towards the inclusion of breeding system in ploidy models (M26, M27) than the inclusion of ploidy in breeding system models (M29, M29)

Model	Marginal log-likelihood	Comparison	K=log(BF(M1,M2))	Preferred Model (Evidence)
M2. CID D/P	-1223.86	M2 vs. M4	0.58	No evidence
M4. D/P +A/B asym	**-1223.28**			
M7. CID D/P+δ	**-1212.42**	M7 vs. M9	-2.04	M7(Moderate)
M9. D/P+A/B+δ asym	-1214.47			
M12. CID I/C	-1267.93	M12 vs. M14	20.22	M14 (Strong)
M14. I/C+ A/B asym	**-1247.72**			
M22. CID ID/CD/CP+δ	-1399.20	M22 vs. M24	12.45	M24 (Strong)
M24. ID/CD/CP +A/B+δ asym	**-1386.74**			

Table 10: Test for the inclusion of focal traits in diversification models via Bayes factors. Models that include ploidy (M4, M9) are moderately or non-preferred over models where the diversification is independent of the ploidy trait (M2, M4). Models that include breeding system are strongly preferred over models where the diversification process is independent of the breeding system trait. A comparison between model M17 versus M19 is missing because of challenges calculating the log-likelihood marginal for M17.