Appendix 4. DT model ranks and ΔDT values for models selected under the alternative hLRT, AIC_c, and BIC methods. Values were calculated based on the output from DTModSel. Missing data indicates that the given method selected the same model as DT.

Data Set	1	2	3
TreeBASE ID	S1266/M2209	S685/M1075	S388/M542
hLRT model	40 / 0.038	2 / 0	31 / 0.004
AIC_c model	13 / 0.010	21 / 0.004	31 / 0.004
BIC model	11 / 0.009	-	31 / 0.004

Data Set	4	5	6
TreeBASE ID	S904/M1486	S631/M977	S1067/M1819
hLRT model	-	-	54 / 0.010
AIC_c model	-	7 / 0.003	46 / 0.006
BIC model	-	-	52 / 0.009

Data Set	7	8	9
TreeBASE ID	S769/M1216	S1038/M1767	S320/M391
hLRT model	8 / 0.073	-	-
AIC_c model	11 / 0.188	23 / 0.042	-
BIC model	-	-	-

Data Set	10	11	12
TreeBASE ID	S430/M630	S981/M1631	S869/M1410
hLRT model	-	11 / 0.002	-
AIC_c model	6 / 0.002	14 / 0.002	-

	BIC model	-	-	-

Data Set	13	14	15
TreeBASE ID	S927/M1533	S1120/M1917	S1123/M1924
hLRT model	-	13 / 0.005	-
AIC$_c$ model	3 / 0.003	-	2 / 0.000
BIC model	-	-	-

Data Set	16	17	18
TreeBASE ID	S662/M1038	S736/M1168	S756/M1194
hLRT model	3 / 0.014	7 / 0.012	-
AIC$_c$ model	-	7 / 0.012	2 / 0.001
BIC model	-	2 / 0.001	-

Data Set	19	20	21
TreeBASE ID	S644/M1001	S1213/M2099	S1078/M1849
hLRT model	-	3 / 0.002	-
AIC$_c$ model	-	3 / 0.002	3 / 0.001
BIC model	-	-	-

Data Set	22	23	24
TreeBASE ID	S3x27x98c12c26c10/ M186c3x27x33c47	S1234/M2146	S1112/M1902
hLRT model	10 / 0.056	-	10 / 0.033
AIC$_c$ model	-	2 / 0.001	-
BIC model	-	-	-

Data Set	25	26	27
TreeBASE ID	S1316/M2309	S426/M620	S808/M1278
hLRT model	-	-	-
AIC$_c$ model	-	-	-
BIC model	7 / 0.002	-	-

Data Set	28	29	30
TreeBASE ID	S1088/M1862	S498/M725	S1096/M1874
hLRT model	-	-	4 / 0.005
AIC$_c$ model	19 / 0.000	4 / 0.041	6 / 0.023
BIC model	2 / 0.000	-	-

Data Set	31	32	33
TreeBASE ID	S1315/M2308	S725/M1156	S259/M299
hLRT model	-	7 / 0.000	11 / 0.003
AIC$_c$ model	2 / 0.001	7 / 0.000	8 / 0.003
BIC model	-	-	-

Data Set	34	35	36
TreeBASE ID	S1069/M1823	S1095/M1873	S771/M1220
hLRT model	5 / 0.001	-	-
AIC$_c$ model	34 / 0.006	-	17 / 0.002
BIC model	-	-	-

Data Set	37	38	39
TreeBASE ID	S428/M626	S553/M824	S1178/M2038
hLRT model	10 / 0.034	-	4 / 0.007
AIC$_c$ model	13 / 0.134	8 / 0.003	11 / 0.014
BIC model	-	-	-

Data Set	40	41	42
TreeBASE ID	S911/M1509	S570/M863	S724/M1155
hLRT model	11 / 0.032	12 / 0.072	13 / 0.000
AIC$_c$ model	5 / 0.014	9 / 0.055	37 / 0.000
BIC model	2 / 0.004	-	-

Data Set	43	44	45
TreeBASE ID	S890/M1452	S390/M545	S693/M1102
hLRT model	-	6 / 0.575	-
AIC$_c$ model	-	2 / 0.016	15 / 0.088
BIC model	-	-	-

Data Set	46	47	48
TreeBASE ID	S1243/M2167	S425/M619	S1304/M2284
hLRT model	-	-	6 / 0.000
AIC$_c$ model	-	-	30 / 0.002
BIC model	-	-	6 / 0.000

Data Set	49	50	51

TreeBASE ID	S3x10x98c09c42c47/ M184c3x2x98c11c12c31	S333/M435	S1262/M2204
hLRT model	12 / 0.057	6 / 0.011	7 / 0.000
AIC$_c$ model	-	-	15 / 0.000
BIC model	-	-	-

Data Set	52	53	54
TreeBASE ID	S2x14x97c16c11c45/ M165c2x14xM165c2x14x	S659/M1034	S711/M1134
hLRT model	15 / 0.041	-	-
AIC$_c$ model	2 / 0.007	3 / 0.001	-
BIC model	-	-	-

Data Set	55	56	57
TreeBASE ID	S1302/M2281	S679/M1064	S712/M1135
hLRT model	-	-	-
AIC$_c$ model	-	-	-
BIC model	-	-	-

Data Set	58	59	60
TreeBASE ID	S367/M502	S322/M401	S1046/M1782
hLRT model	-	24 / 0.043	-
AIC$_c$ model	12 / 0.017	6 / 0.005	2 / 0.001
BIC model	-	-	-

Data Set	61	62	63

TreeBASE ID	S529/M777	S1217/M2104	S400/M568
hLRT model	2 / 0.001	12 / 0.039	5 / 0.004
AIC$_c$ model	2 / 0.001	-	8 / 0.005
BIC model	-	-	-

Data Set	**64**	**65**	**66**
TreeBASE ID	S958/M1589	S964/M1596	S522/M760
hLRT model	11 / 0.016	6 / 0.036	6 / 0.028
AIC$_c$ model	-	10 / 0.051	10 / 0.034
BIC model	-	-	-

Data Set	**67**	**68**	**69**
TreeBASE ID	S967/M1604	S608/M935	S385/M537
hLRT model	19 / 0.001	12 / 0.003	11 / 0.017
AIC$_c$ model	19 / 0.001	3 / 0.001	11 / 0.017
BIC model	-	-	-

Data Set	**70**	**71**	**72**
TreeBASE ID	S6x22x97c14c38c41/ M170c6x22x97c14c48c20	S1000/M1688	S1227/M2133
hLRT model	-	-	7 / 0.066
AIC$_c$ model	2 / 0.002	-	-
BIC model	-	-	-

Data Set	**73**	**74**	**75**
TreeBASE ID	S440/M647	S1212/M2098	S463/M676

hLRT model	-	-	-
AIC$_c$ model	-	-	13 / 0.011
BIC model	-	-	-

Data Set	76	77	78
TreeBASE ID	S990/M1650	S1013/M1709	S560/M847
hLRT model	-	-	6 / 1.012
AIC$_c$ model	7 / 0.007	-	6 / 1.012
BIC model	-	-	-

Data Set	79	80	81
TreeBASE ID	S1053/M1794	S980/M1630	S548/M808
hLRT model	10 / 0.002	-	-
AIC$_c$ model	2 / 0.000	-	-
BIC model	-	-	-

Data Set	82	83	84
TreeBASE ID	S1186/M2053	S605/M929	S1099/M1881
hLRT model	-	4 / 0.005	12 / 0.013
AIC$_c$ model	-	-	3 / 0.007
BIC model	-	4 / 0.005	-

Data Set	85	86	87
TreeBASE ID	S945/M1568	S436/M641	S489/M714
hLRT model	3 / 0.000	20 / 0.057	37 / 0.038

AIC$_c$ model	3 / 0.000	20 / 0.057	2 / 0.000
BIC model	3 / 0.000	2 / 0.000	2 / 0.000

Data Set	88	89	90
TreeBASE ID	S413/M603	S1192/M2059	S1313/M2305
hLRT model	18 / 0.006	20 / 0.038	21 / 0.001
AIC$_c$ model	22 / 0.007	-	17 / 0.001
BIC model	-	-	-

Data Set	91	92	93
TreeBASE ID	S472/M688	S1030/M1749	S1036/M1760
hLRT model	2 / 0.000	4 / 0.006	4 / 0.019
AIC$_c$ model	-	2 / 0.004	3 / 0.007
BIC model	2 / 0.000	-	-

Data Set	94	95	96
TreeBASE ID	S432/M636	S578/M872	S804/M1270
hLRT model	3 / 0.187	-	-
AIC$_c$ model	-	-	5 / 0.001
BIC model	-	-	-

Data Set	97	98	99
TreeBASE ID	S821/M1318	S568/M861	S1051/M1792
hLRT model	2 / 0.000	11 / 0.012	-
AIC$_c$ model	14 / 0.012	8 / 0.008	-

	BIC model	2 / 0.000	-	-

Data Set	**100**	**101**	**102**
TreeBASE ID	S11x6x95c10c11c33/ M58c11x6x95c10c13c27	S1094/M1869	S777/M1232
hLRT model	16 / 0.010	7 / 0.011	13 / 0.004
AIC$_c$ model	-	-	15 / 0.005
BIC model	-	-	-

Data Set	**103**	**104**	**105**
TreeBASE ID	S421/M615	S916/M1516	S664/M1042
hLRT model	6 / 0.007	-	-
AIC$_c$ model	6 / 0.007	-	2 / 0.001
BIC model	-	-	-

Data Set	**106**	**107**	**108**
TreeBASE ID	S1140/M1958	S671/M1053	S584/M880
hLRT model	-	13 / 0.011	16 / 0.002
AIC$_c$ model	-	24 / 0.022	36 / 0.007
BIC model	-	-	-

Data Set	**109**	**110**	**111**
TreeBASE ID	S753/M1189	S533/M780	S375/M515
hLRT model	-	-	6 / 0.019
AIC$_c$ model	8 / 0.002	2 / 0.011	4 / 0.008
BIC model	-	-	-

Data Set	112	113	114
TreeBASE ID	S1197/M2066	S884/M1435	S1322/M2318
hLRT model	11 / 0.002	-	-
AIC$_c$ model	9 / 0.001	11 / 0.002	-
BIC model	-	-	-

Data Set	115	116	117
TreeBASE ID	S941/M1560	S6x23x97c17c57c34/ M171c6x23x97c18c01c10	S557/M837
hLRT model	9 / 0.008	-	10 / 0.075
AIC$_c$ model	4 / 0.001	-	-
BIC model	-	-	-

Data Set	118	119	120
TreeBASE ID	S703/M1124	S1089/M1864	S1020/M1727
hLRT model	4 / 0.000	3 / 0.000	2 / 0.007
AIC$_c$ model	4 / 0.000	3 / 0.000	-
BIC model	-	-	-

Data Set	121	122	123
TreeBASE ID	S1278/M2234	S1097/M1877	S619/M955
hLRT model	9 / 0.011	10 / 0.002	9 / 0.009
AIC$_c$ model	9 / 0.011	10 / 0.002	9 / 0.009
BIC model	-	-	-

Data Set	124	125	126
TreeBASE ID	S902/M1482	S824/M1323	S667/M1048
hLRT model	5 / 0.002	4 / 0.002	-
AIC$_c$ model	5 / 0.002	-	3 / 0.002
BIC model	-	-	-

Data Set	127	128	129
TreeBASE ID	S700/M1118	S1061/M1811	S731/M1163
hLRT model	7 / 0.005	10 / 0.004	-
AIC$_c$ model	-	10 / 0.004	6 / 0.012
BIC model	-	-	-

Data Set	130	131	132
TreeBASE ID	S1307/M2290	S470/M685	S681/M1066
hLRT model	-	-	-
AIC$_c$ model	20 / 0.003	-	4 / 0.001
BIC model	2 / 0.000	-	-

Data Set	133	134	135
TreeBASE ID	S1052/M1793	S284/M322	S1071/M1827
hLRT model	4 / 0.008	3 / 0.015	-
AIC$_c$ model	-	8 / 0.040	2 / 0.001
BIC model	-	-	-

Data Set	136	137	138

TreeBASE ID	S554/M825	S1037/M1765	S816/M1305
hLRT model	-	-	-
AIC$_c$ model	4 / 0.013	6 / 0.000	4 / 0.003
BIC model	-	-	-

Data Set	**139**	**140**	**141**
TreeBASE ID	S643/M1000	S669/M1051	S1230/M2141
hLRT model	3 / 0.000	-	6 / 0.000
AIC$_c$ model	47 / 0.003	-	6 / 0.000
BIC model	3 / 0.000	-	-

Data Set	**142**	**143**	**144**
TreeBASE ID	S647/M1013	S1296/M2273	S397/M565
hLRT model	-	31 / 0.001	5 / 0.015
AIC$_c$ model	-	-	-
BIC model	-	-	-

Data Set	**145**	**146**	**147**
TreeBASE ID	S404/M584	S997/M1673	S422/M616
hLRT model	-	14 / 0.001	10 / 0.173
AIC$_c$ model	11 / 0.002	6 / 0.000	2 / 0.028
BIC model	-	-	-

Data Set	**148**	**149**	**150**

TreeBASE ID	S818/M1310	S357/M489	S1177/M2035
hLRT model	-	8 / 0.001	3 / 0.000
AIC$_c$ model	8 / 0.001	-	11 / 0.003
BIC model	2 / 0.000	-	-

Data Set	151	152	153
TreeBASE ID	S726/M1157	S351/M468	S971/M1612
hLRT model	5 / 0.004	6 / 0.006	-
AIC$_c$ model	-	5 / 0.005	-
BIC model	-	-	-

Data Set	154	155	156
TreeBASE ID	S1006/M1698	S1057/M1802	S658/M1032
hLRT model	-	-	-
AIC$_c$ model	5 / 0.001	-	53 / 0.015
BIC model	-	-	-

Data Set	157	158	159
TreeBASE ID	S657/M1031	S1180/M2041	S1090/M1865
hLRT model	4 / 0.001	2 / 0.001	-
AIC$_c$ model	12 / 0.001	2 / 0.001	4 / 0.000
BIC model	-	-	-

Data Set	160	161	162
TreeBASE ID	S466/M680	S799/M1265	S757/M1197

hLRT model	2 / 0.013	16 / 0.017	3 / 0.000
AIC$_c$ model	2 / 0.013	6 / 0.006	5 / 0.003
BIC model	-	-	3 / 0.000

Data Set	163	164	165
TreeBASE ID	S928/M1538	S1023/M1734	S1229/M2139
hLRT model	7 / 0.006	2 / 0.081	30 / 0.002
AIC$_c$ model	19 / 0.014	2 / 0.081	3 / 0.000
BIC model	-	-	30 / 0.002

Data Set	166	167	168
TreeBASE ID	S305/M347	S1161/M1998	S414/M604
hLRT model	10 / 0.021	12 / 0.035	-
AIC$_c$ model	-	8 / 0.027	-
BIC model	-	-	-

Data Set	169	170	171
TreeBASE ID	S1059/M1806	S969/M1606	S1125/M1928
hLRT model	-	-	-
AIC$_c$ model	6 / 0.001	3 / 0.000	4 / 0.005
BIC model	-	-	-

Data Set	172	173	174
TreeBASE ID	S1301/M2279	S543/M801	S1041/M1775
hLRT model	6 / 0.002	5 / 0.025	-

AIC$_c$ model	9 / 0.005	-	-
BIC model	-	-	-

Data Set	**175**	**176**	**177**
TreeBASE ID	S701/M1119	S887/M1438	S1199/M2068
hLRT model	6 / 0.010	-	9 / 0.001
AIC$_c$ model	4 / 0.005	17 / 0.016	-
BIC model	-	-	-

Data Set	**178**	**179**	**180**
TreeBASE ID	S655/M1029	S709/M1131	S1028/M1746
hLRT model	5 / 0.049	5 / 0.011	-
AIC$_c$ model	-	-	9 / 0.001
BIC model	-	-	-

Data Set	**181**	**182**	**183**
TreeBASE ID	S833/M1334	S672/M1054	S331/M433
hLRT model	-	17 / 0.020	4 / 0.000
AIC$_c$ model	-	-	2 / 0.000
BIC model	-	-	-

Data Set	**184**	**185**	**186**
TreeBASE ID	S903/M1483	S1162/M1999	S1001/M1692
hLRT model	16 / 0.029	12 / 0.042	16 / 0.039
AIC$_c$ model	3 / 0.010	10 / 0.029	20 / 0.049

| BIC model | - | - | - |

Data Set	**187**	**188**	**189**
TreeBASE ID	S892/M1465	S1195/M2064	S798/M1263
hLRT model	-	-	-
AIC$_c$ model	23 / 0.212	12 / 0.001	-
BIC model	-	-	-

Data Set	**190**	**191**	**192**
TreeBASE ID	S1018/M1725	S1155/M1984	S979/M1629
hLRT model	4 / 0.008	-	7 / 0.003
AIC$_c$ model	-	42 / 0.001	-
BIC model	-	-	-

Data Set	**193**	**194**	**195**
TreeBASE ID	S532/M779	S935/M1550	S1101/M1883
hLRT model	12 / 0.025	2 / 0.001	9 / 0.078
AIC$_c$ model	-	32 / 0.037	51 / 2.193
BIC model	-	2 / 0.001	-

Data Set	**196**	**197**	**198**
TreeBASE ID	S1008/M1704	S1050/M1790	S621/M959
hLRT model	-	3 / 0.000	2 / 0.000
AIC$_c$ model	26 / 0.009	2 / 0.000	2 / 0.000
BIC model	-	2 / 0.000	2 / 0.000

Data Set	199	200	201
TreeBASE ID	S1092/M1867	S914/M1512	S1312/M2300
hLRT model	3 / 0.000	-	-
AIC$_c$ model	-	-	6 / 0.105
BIC model	-	-	-

Data Set	202	203	204
TreeBASE ID	S1320/M2316	S838/M1354	S1044/M1780
hLRT model	-	-	-
AIC$_c$ model	-	-	-
BIC model	-	-	-

Data Set	205	206	207
TreeBASE ID	S1295/M2266	S920/M1521	S1298/M2276
hLRT model	-	6 / 0.001	-
AIC$_c$ model	-	6 / 0.001	8 / 0.044
BIC model	-	9 / 0.002	-

Data Set	208	209	210
TreeBASE ID	S1253/M2191	S338/M441	S565/M856
hLRT model	17 / 0.005	-	14 / 0.018
AIC$_c$ model	17 / 0.005	16 / 0.012	11 / 0.005
BIC model	-	-	-

Data Set	211	212	213
TreeBASE ID	S1010/M1706	S384/M536	S1303/M2283
hLRT model	23 / 0.021	20 / 0.035	-
AIC$_c$ model	-	-	-
BIC model	-	-	-

Data Set	214	215	216
TreeBASE ID	S524/M765	S837/M1353	S392/M548
hLRT model	5 / 0.257	-	-
AIC$_c$ model	-	-	5 / 0.010
BIC model	-	-	-

Data Set	217	218	219
TreeBASE ID	S1072/M1828	S496/M722	S1122/M1919
hLRT model	-	17 / 0.007	2 / 0.003
AIC$_c$ model	-	25 / 0.020	3 / 0.005
BIC model	-	-	-

Data Set	220	221	222
TreeBASE ID	S1200/M2069	S983/M1636	S773/M1224
hLRT model	11 / 5.694	25 / 0.062	2 / 0.043
AIC$_c$ model	-	24 / 0.058	5 / 0.074
BIC model	-	7 / 0.014	-

Data Set	223	224	225

TreeBASE ID	S1310/M2295	S1126/M1930	S836/M1352
hLRT model	3 / 0.001	13 / 0.000	2 / 0.001
AIC$_c$ model	3 / 0.001	3 / 0.000	-
BIC model	-	-	-

Data Set	226	227	228
TreeBASE ID	S1102/M1884	S396/M564	S382/M529
hLRT model	-	-	18 / 0.005
AIC$_c$ model	6 / 0.006	5 / 0.006	6 / 0.001
BIC model	-	-	13 / 0.002

Data Set	229	230	231
TreeBASE ID	S1305/M2286	S962/M1594	S1007/M1700
hLRT model	-	35 / 0.121	-
AIC$_c$ model	-	-	-
BIC model	-	-	-

Data Set	232	233	234
TreeBASE ID	S1014/M1717	S737/M1169	S1289/M2256
hLRT model	-	-	-
AIC$_c$ model	-	-	-
BIC model	-	-	-

Data Set	235	236	237

TreeBASE ID	S792/M1215	S1270/M2218	S1231/M2143
hLRT model	-	11 / 0.019	7 / 0.102
AIC$_c$ model	-	-	7 / 0.102
BIC model	-	-	-

Data Set	**238**	**239**	**240**
TreeBASE ID	S1075/M1832	S1070/M1826	S403/M581
hLRT model	-	-	25 / 0.025
AIC$_c$ model	-	7 / 0.000	11 / 0.005
BIC model	-	-	-

Data Set	**241**	**242**	**243**
TreeBASE ID	S1127/M1933	S1163/M000	S537/M787
hLRT model	21 / 0.001	-	16 / 0.004
AIC$_c$ model	42 / 0.003	18 / 0.010	3 / 0.001
BIC model	-	-	-

Data Set	**244**	**245**	**246**
TreeBASE ID	S1235/M2149	S1216/M2102	S1039/M1769
hLRT model	11 / 0.006	9 / 0.005	8 / 0.036
AIC$_c$ model	4 / 0.001	12 / 0.006	8 / 0.036
BIC model	2 / 0.000	-	3 / 0.001

Data Set	**247**	**248**	**249**
TreeBASE ID	S1060/M1809	S368/M503	S389/M543

hLRT model	2 / 0.014	33 / 9.709	-
AIC$_c$ model	2 / 0.014	33 / 9.709	5 / 0.001
BIC model	-	-	-

Data Set	**250**

TreeBASE ID	S939/M1556
hLRT model	23 / 0.104
AIC$_c$ model	-
BIC model	-