

New Phytologist Supporting Information

Article title: **Long-term responses of life-history strategies to climatic variability in flowering plants**

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The following Supporting Information is available for this article:

Figure S1. Mean probability of an annual root state for each of the 32 analyzed clades. Error bars show the range of probabilities for ancestral state reconstructed in the root of each phylogeny depending on a given bioclimatic variable.

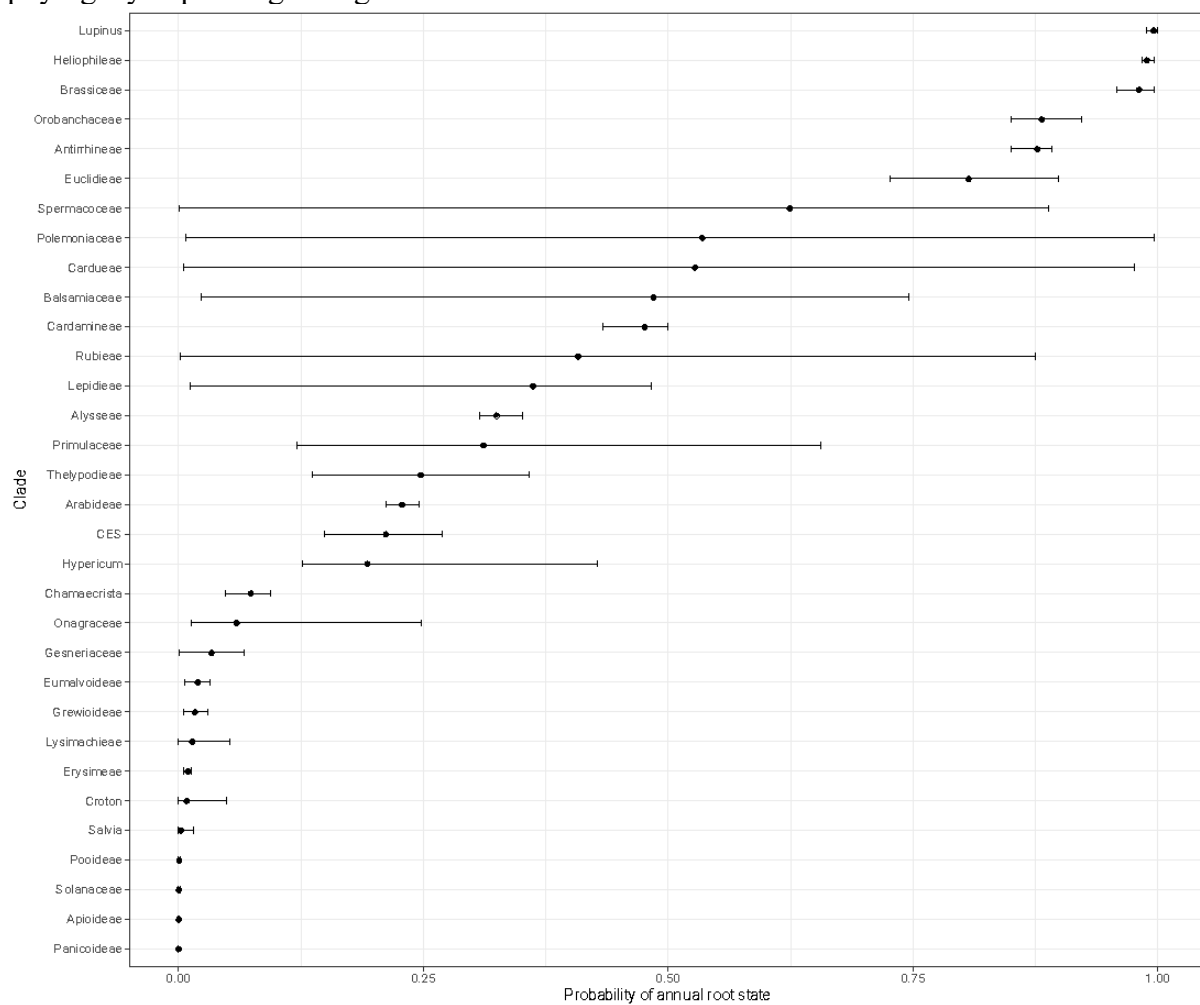


Table S1 Parameter estimates from the model averaged hOUwie fits for BIO1

Group.1	Group.2	rates	alpha	sigma.sq	theta	expected mean	expected var
Alysseae	annual	0.04222935	6.77642682	0.00120016	11.6358211	11.599203	0.00010195
Antirrhineae	annual	0.03352804	0.05283134	2.79E-05	16.4969491	16.474252	0.00026284
Apioidae	annual	0.01257536	0.09463659	2.60E-05	17.2854379	13.9009453	0.00020198
Arabideae	annual	0.27432857	1.43675206	0.00151969	6.86915524	5.9892773	0.00052886
Balsamiaceae	annual	0.01477442	0.12344513	5.84E-05	13.0946964	13.4773253	0.00023675
Brassicaceae	annual	0.05602161	7.38562273	0.0029488	15.075985	15.0753257	0.00019591
Cardamineae	annual	0.02703944	1.56747447	0.00061663	13.7721924	11.5653176	0.00042866
Cardueae	annual	0.05775609	0.04988559	3.19E-05	59.6526461	12.6869729	0.00032851
CES	annual	0.09746567	8.01E-05	2.26E-05	1494.21649	5.18294859	0.00045133
Chamaecrista	annual	0.0798664	0.19370296	1.06E-05	23.5948827	23.4885925	2.89E-05
Croton	annual	0.01352555	0.09443209	5.06E-05	22.2632167	22.4232046	0.0001998
Erysimeae	annual	0.18350651	0.57528604	0.00021464	9.48554426	9.55440502	0.00023344
Euclidiaceae	annual	0.04170806	1.44339278	0.00194283	9.5400535	9.31514576	0.00069451
Eumalvoideae	annual	0.04097997	0.07407	4.08E-05	19.3896529	19.3014422	0.00027518
Gesneriaceae	annual	0.02339613	0.01142421	5.37E-06	293.347346	21.0624018	0.00031562
Grewioideae	annual	0.0181161	0.02400397	4.95E-06	22.8486457	22.7632131	0.00010369
Heliophilleae	annual	0.03608735	5.34179125	0.00021168	16.4494834	16.4494831	1.94E-05
Hypericum	annual	0.08462825	0.38829114	0.00015669	15.0683909	15.0818612	0.00020344
Lepidieae	annual	0.28809948	0.07966505	0.0006015	14.361843	14.3617829	0.00222598
Lupinus	annual	0.08945093	0.00771825	1.40E-05	13.8705263	13.8615744	0.00019324
Lysimachieae	annual	0.031292	0.07225652	6.49E-06	17.9111068	13.8900604	0.00016277
Onagraceae	annual	0.08565747	0.33838161	0.00030812	14.4855368	14.4851097	0.00047495
Orobanchaceae	annual	0.05004705	0.0930598	7.61E-05	13.1565371	13.1141786	0.00045983
Panicoideae	annual	0.02674436	5.12319916	0.00143838	21.9289641	21.9190316	0.00014045
Polemoniaceae	annual	0.01113531	0.0500847	2.15E-05	13.509091	13.5019742	0.00022586
Pooideae	annual	0.01881985	2.24398818	0.00058969	13.7395079	13.3865246	0.00014158
Primulaceae	annual	0.02811619	0.1964767	0.00015072	5.20605779	5.66541944	0.00038335
Rubieae	annual	0.20261902	14.7219208	0.00248467	14.2412054	14.2410898	8.60E-05
Salvia	annual	0.01835306	0.09468796	2.79E-05	16.9541833	15.9886691	0.00014706
Solanaceae	annual	0.04090887	0.11920195	7.30E-05	16.7514343	16.8145424	0.00030601
Spermacoceae	annual	0.03367712	0.10978934	3.28E-05	22.276896	22.0518739	0.00014929
Thelypodieae	annual	0.03081334	0.60214063	0.00018454	16.0302033	15.1078576	0.00014456
Alysseae	perennial	0.02199708	6.77642682	0.00172702	10.5103978	10.5140164	0.00011952
Antirrhineae	perennial	0.0120018	0.05283134	2.51E-05	15.7493571	16.1769452	0.00024855
Apioidae	perennial	0.01301074	0.09463659	6.74E-05	10.437412	10.4937058	0.00035442
Arabideae	perennial	0.07987928	1.43675206	0.00151978	3.9353687	3.94547408	0.0005289
Balsamiaceae	perennial	0.01437154	0.12344513	5.84E-05	19.2453076	18.2078246	0.00023695
Brassicaceae	perennial	0.01854014	7.38562273	0.0027768	13.9219199	13.9410979	0.00019018
Cardamineae	perennial	0.03890428	1.56747447	0.00159958	7.4862357	7.55988708	0.00046145
Cardueae	perennial	0.02756332	0.04988559	3.24E-05	12.2762565	12.347128	0.00033127
CES	perennial	0.02950397	8.01E-05	1.17E-05	5.05167277	5.06660478	0.00037914
Chamaecrista	perennial	0.01107084	0.19370296	1.11E-05	23.3225387	23.327161	2.90E-05
Croton	perennial	0.00522272	0.09443209	1.77E-05	22.5238456	22.5227251	9.53E-05
Erysimeae	perennial	0.02713203	0.57528604	0.00021566	9.59452891	9.5930655	0.00023058
Euclidiaceae	perennial	0.0541651	1.44339278	0.00119481	-1.2958894	-0.7259879	0.00066824
Eumalvoideae	perennial	0.01231403	0.07407	4.02E-05	19.3179258	19.3162748	0.00027108
Gesneriaceae	perennial	0.00224955	0.01142421	8.21E-06	35.6042325	19.204447	0.00034181
Grewioideae	perennial	0.00193145	0.02400397	5.42E-06	22.5575966	22.576185	0.00011109
Heliophilleae	perennial	0.02447892	5.34179125	0.00021505	15.7401801	15.7456377	1.97E-05
Hypericum	perennial	0.01696327	0.38829114	0.00015788	15.1333481	15.1298741	0.00020352
Lepidieae	perennial	0.24003825	0.07966505	8.02E-05	14.3604909	14.3605583	0.00105854
Lupinus	perennial	0.17200849	0.00771825	9.51E-05	13.7664455	13.7887147	0.00051338
Lysimachieae	perennial	0.02562137	0.07225652	4.35E-05	12.0365717	12.1366828	0.00029724
Onagraceae	perennial	0.01231289	0.33838161	0.00035963	14.5595015	14.5592252	0.00052732
Orobanchaceae	perennial	0.04045963	0.0930598	0.00013524	12.8453955	12.9271392	0.00070211
Panicoideae	perennial	0.04224172	5.12319916	0.00143819	20.9175867	20.9224078	0.00014036
Polemoniaceae	perennial	0.01061253	0.0500847	6.56E-05	13.3968991	13.4439605	0.00053359
Pooideae	perennial	0.0305447	2.24398818	0.00230108	7.20217553	7.22005428	0.00051208
Primulaceae	perennial	0.01059084	0.1964767	0.00015072	6.8216377	6.78214719	0.00038336
Rubieae	perennial	0.07609358	14.7219208	0.00645165	10.7557004	10.7626708	0.00021825
Salvia	perennial	0.01337889	0.09468796	2.79E-05	15.5519714	15.5541254	0.00014708
Solanaceae	perennial	0.01390362	0.11920195	7.30E-05	16.8991125	16.8973386	0.00030601
Spermacoceae	perennial	0.01348743	0.10978934	3.28E-05	18.8112359	19.747762	0.00014929
Thelypodieae	perennial	0.07954879	0.60214063	0.00017023	9.30177869	9.40325401	0.00014408

Table S2 Parameter estimates from the model-averaged hOUwie fits for BIO4

Group.1	Group.2	rates	alpha	sigma.sq	theta	expected mean	expected var
Alysseae	annual	0.04623064	0.29525668	0.01411517	1001.04014	1000.51526	0.02446976
Antirrhineae	annual	0.03545918	0.03345322	0.00156237	838.583326	839.489812	0.02628025
Apioideae	annual	0.02391669	0.07987379	0.01081229	943.663154	933.266706	0.07501499
Arabideae	annual	1.1513118	0.68015068	0.02881815	993.317362	992.392174	0.04742367
Balsamiaceae	annual	0.0145933	0.00380646	0.00582319	346378.375	849.973796	0.22211988
Brassicaceae	annual	0.05688646	5.02214681	0.35297626	865.438844	865.480434	0.03502791
Cardamineae	annual	0.03194164	0.3267593	0.09297251	910.867313	908.066406	0.14241586
Cardueae	annual	0.07035134	0.09020761	0.00787459	938.278821	930.337622	0.04564716
CES	annual	0.10411611	0.00666191	0.00365852	1613.95006	832.713664	0.14640274
Chamaecrista	annual	0.06874797	0.13331923	0.00168011	421.584619	419.653079	0.00632869
Croton	annual	0.03179358	0.13380144	0.02210604	944.867343	786.431857	0.07999859
Erysimeae	annual	0.1982503	0.05325203	0.01549671	1008.16369	1007.71817	0.12207182
Euclidiaceae	annual	0.04590691	0.57957188	0.00504498	1159.92731	1159.7501	0.00417278
Eumalvoideae	annual	0.04196715	0.07993348	0.02366537	573.698439	564.939218	0.13420067
Gesneriaceae	annual	0.01034297	0.00011715	0.00273603	479.559184	479.624543	0.19744503
Grewioideae	annual	0.01839739	0.05615118	0.00826692	531.339029	521.780875	0.07368693
Heliophileae	annual	0.03394285	0.22994972	0.00241149	680.822714	680.805003	0.0066169
Hypericum	annual	0.10949778	0.02634112	0.0587529	1059.13797	892.645913	0.61556299
Lepidieae	annual	0.26785015	1.20419534	0.18476812	867.865367	860.580185	0.07780927
Lupinus	annual	0.03317324	0.00150559	0.00411432	767.461383	766.211687	0.07422281
Lysimachieae	annual	0.0339976	0.00206873	6.37E-05	815.378812	825.214515	0.19087424
Onagraceae	annual	0.07402165	0.05566329	0.0367747	716.509791	717.691354	0.2833446
Orobanchaceae	annual	0.04951053	0.10805047	0.01816022	864.614561	867.539143	0.08662163
Panicoideae	annual	0.04060338	5.82108862	0.98246451	549.640242	549.634825	0.08443686
Polemoniaceae	annual	0.01199421	0.03094406	0.00421092	936.138183	924.871046	0.06812361
Pooideae	annual	0.02256814	0.59969435	0.05025966	925.96754	916.432884	0.05014514
Primulaceae	annual	0.03228184	2.55118575	0.19729472	1067.51702	1065.14705	0.03996562
Rubieae	annual	0.13120271	0.95176001	0.01740108	885.231527	885.289456	0.00988396
Salvia	annual	0.03575222	0.04632607	0.01112849	889.904718	756.566801	0.12203424
Solanaceae	annual	0.03324896	0.10759233	0.0275607	565.977753	547.629476	0.12826102
Spermacoceae	annual	0.05419206	0.0574132	0.04481367	426.02468	451.752564	0.20473137
Thelypodieae	annual	0.03099634	0.00627389	0.00654888	841.947965	840.304406	0.09617648
Alysseae	perennial	0.02644351	0.29525668	0.01317552	996.015901	996.561161	0.02389206
Antirrhineae	perennial	0.01566215	0.03345322	0.00567421	837.302126	838.907877	0.0552575
Apioideae	perennial	0.01284296	0.07987379	0.01407058	923.416731	923.560248	0.09002476
Arabideae	perennial	0.25307988	0.68015068	0.14579052	991.071352	991.113327	0.10693386
Balsamiaceae	perennial	0.01369379	0.00380646	0.00053683	294.505224	418.545005	0.09613556
Brassicaceae	perennial	0.0212001	5.02214681	0.35268411	904.628579	903.539404	0.03489985
Cardamineae	perennial	0.03668898	0.3267593	0.09180805	903.092943	903.216508	0.1406005
Cardueae	perennial	0.01723469	0.09020761	0.01433502	926.199939	926.071184	0.06900279
CES	perennial	0.03064458	0.00666191	0.00627936	790.30862	812.204552	0.15948445
Chamaecrista	perennial	0.01191969	0.13331923	0.00166961	417.479165	417.536707	0.0063186
Croton	perennial	0.00530538	0.13380144	0.01444485	441.669282	449.858644	0.05466812
Erysimeae	perennial	0.0282361	0.05325203	0.01877336	1006.94915	1006.95589	0.1251606
Euclidiaceae	perennial	0.05983	0.57957188	0.04756543	1135.80506	1136.15584	0.04448762
Eumalvoideae	perennial	0.01466083	0.07993348	0.01366449	553.671627	554.652931	0.08879878
Gesneriaceae	perennial	0.00239728	0.00011715	0.0027086	479.622938	479.632455	0.19628061
Grewioideae	perennial	0.00198939	0.05615118	0.00888641	461.762101	465.804725	0.07974829
Heliophileae	perennial	0.02053737	0.22994972	0.00262652	676.483309	678.326028	0.00675669
Hypericum	perennial	0.0135637	0.02634112	0.00773588	859.501785	872.116987	0.33904791
Lepidieae	perennial	0.20604805	1.20419534	0.17984272	809.447138	820.311873	0.07520574
Lupinus	perennial	0.08571184	0.00150559	0.02851749	698.858054	759.650441	0.17487776
Lysimachieae	perennial	0.02746466	0.00206873	0.00905691	826.014558	825.973939	0.24500091
Onagraceae	perennial	0.010763	0.05566329	0.01796286	673.965449	682.706142	0.23232201
Orobanchaceae	perennial	0.04493717	0.10805047	0.02204674	878.88469	876.584242	0.10108514
Panicoideae	perennial	0.04248433	5.82108862	0.98241422	548.358333	548.364392	0.08443103
Polemoniaceae	perennial	0.01019994	0.03094406	0.00516661	418.137332	689.649525	0.07613777
Pooideae	perennial	0.0313471	0.59969435	0.15827396	873.220878	873.636097	0.13148293
Primulaceae	perennial	0.01169352	2.55118575	0.19162347	940.087717	940.121823	0.03752795
Rubieae	perennial	0.01132199	0.95176001	0.08604369	887.015009	886.936364	0.04423067
Salvia	perennial	0.01331384	0.04632607	0.01239111	732.177346	732.523841	0.12671422
Solanaceae	perennial	0.01325026	0.10759233	0.0277963	527.868206	528.177482	0.12907516
Spermacoceae	perennial	0.02360441	0.0574132	0.01400538	494.215488	491.398934	0.12128527
Thelypodieae	perennial	0.07839508	0.00627389	0.00666205	839.593379	840.144516	0.09670056

Table S3 Parameter estimates from the model averaged hOUwie fits for BIO5.

Group.1	Group.2	rates	alpha	sigma.sq	theta	expected mean	expected var
Alysseae	annual	0.04337222	10.6994061	0.00181687	27.1166682	27.1134443	8.84E-05
Antirrhineae	annual	0.03134976	0.10723967	3.72E-05	29.7492161	29.7062696	0.00017423
Apioidae	annual	0.01620089	0.19195569	9.63E-05	31.5150133	29.4248292	0.00024946
Arabideae	annual	0.27197746	2.01303375	0.00133574	23.0705727	21.9706136	0.0003282
Balsamiaceae	annual	0.01449122	0.25096766	7.73E-05	24.4622633	24.4695021	0.00015536
Brassicaceae	annual	0.05795414	10.2964912	0.00437339	28.505024	28.5050131	0.00021431
Cardamineae	annual	0.02563818	6.74858649	0.00272862	26.0792835	25.8167091	0.00020681
Cardueae	annual	0.0714986	0.12847278	4.84E-05	29.6563315	29.4250386	0.00018871
CES	annual	0.1047205	0.00790863	1.86E-05	168.146636	18.8642562	0.00051714
Chamaecrista	annual	0.09043656	0.45939341	2.18E-05	31.159002	30.6792633	2.95E-05
Croton	annual	0.02748687	0.11922311	2.21E-05	29.0554108	29.0487245	9.27E-05
Erysimeae	annual	0.18148684	4.08360477	0.00064567	25.4569097	25.4175552	0.00016716
Euclidiaceae	annual	0.03490325	13.684164	0.02284841	28.7276635	28.7031489	0.00082231
Eumalvoideae	annual	0.03909404	0.06037643	2.93E-05	28.4445017	28.4219481	0.00024352
Gesneriaceae	annual	0.007603	0.0490575	9.58E-06	26.4865403	26.4864758	9.90E-05
Grewioideae	annual	0.02291133	2.54756316	0.00032241	30.8505594	30.8194556	6.42E-05
Heliophileae	annual	0.0345661	3.84160829	0.0002021	28.2760965	28.27605	2.42E-05
Hypericum	annual	0.08139911	0.05856605	5.05E-05	28.2388658	26.8724685	0.00048208
Lepidieae	annual	0.27812295	12.7990663	0.00756354	28.9273622	28.8702129	0.00029957
Lupinus	annual	0.03112251	0.02696097	2.58E-05	26.4386383	26.3680204	0.00026135
Lysimachieae	annual	0.04106105	0.12980581	2.50E-05	31.8765016	26.366249	0.00010913
Onagraceae	annual	0.02918668	0.47536547	0.00040129	30.9680118	30.7841683	0.00042586
Orobanchaceae	annual	0.04944369	0.36440144	0.00012831	26.9652409	26.867926	0.00018263
Panicoideae	annual	0.02191758	10.1067817	0.0017054	30.5397738	30.5380222	8.52E-05
Polemoniaceae	annual	0.01169879	0.07125677	4.05E-05	28.8676101	28.8663668	0.000284
Pooideae	annual	0.02549196	9.27369114	0.00549692	28.2741001	28.2095742	0.00029637
Primulaceae	annual	0.03001064	0.22886667	0.00011637	20.4227465	20.2923207	0.00025699
Rubieae	annual	0.07146282	11.3357708	0.00180116	27.3842536	27.3710283	8.23E-05
Salvia	annual	0.01791912	0.12517184	2.55E-05	27.4405428	27.2627386	0.00013596
Solanaceae	annual	0.03815547	0.16530149	7.87E-05	25.6218183	25.6218162	0.00023809
Spermacoceae	annual	0.03353691	0.11487522	1.19E-05	29.1766623	29.1766282	5.15E-05
Thelypodieae	annual	0.03237878	0.0634584	7.00E-05	31.7862202	29.6540432	0.00056777
Alysseae	perennial	0.02426779	10.6994061	0.00220883	26.6235869	26.6237214	0.00010143
Antirrhineae	perennial	0.01203507	0.10723967	3.72E-05	27.4527429	28.3186798	0.00017427
Apioidae	perennial	0.01339412	0.19195569	9.24E-05	24.4896495	24.5452359	0.0002408
Arabideae	perennial	0.07331012	2.01303375	0.00130584	18.8053626	18.8193568	0.00032613
Balsamiaceae	perennial	0.01216597	0.25096766	7.21E-05	24.6623734	24.6397144	0.00014281
Brassicaceae	perennial	0.0193124	10.2964912	0.0048282	28.4783565	28.4786712	0.00022954
Cardamineae	perennial	0.03506271	6.74858649	0.00289792	21.2773619	21.2810615	0.00021244
Cardueae	perennial	0.01506848	0.12847278	4.84E-05	24.1898272	26.2974977	0.0001887
CES	perennial	0.02988037	0.00790863	2.07E-05	18.4419802	18.4764177	0.00052526
Chamaecrista	perennial	0.01294343	0.45939341	2.57E-05	29.0915432	29.1208672	2.97E-05
Croton	perennial	0.00572356	0.11922311	2.21E-05	29.0406205	29.0407615	9.28E-05
Erysimeae	perennial	0.02578306	4.08360477	0.00165405	25.2774197	25.278247	0.00020125
Euclidiaceae	perennial	0.0509384	13.684164	0.00071978	13.8083493	13.8495702	5.00E-05
Eumalvoideae	perennial	0.01214217	0.06037643	2.90E-05	28.4211974	28.4212627	0.0002419
Gesneriaceae	perennial	0.00236961	0.0490575	9.61E-06	26.486387	26.4863866	0.00010048
Grewioideae	perennial	0.00347057	2.54756316	0.00020284	29.3816285	29.3899184	4.59E-05
Heliophileae	perennial	0.02074398	3.84160829	0.0001305	26.9801262	27.0460602	2.14E-05
Hypericum	perennial	0.01772965	0.05856605	4.94E-05	26.4522746	26.4913315	0.00047563
Lepidieae	perennial	0.23259435	12.7990663	0.00853369	27.1273164	27.1996417	0.00033105
Lupinus	perennial	0.08186885	0.02696097	8.23E-05	25.6003891	25.8845822	0.00050458
Lysimachieae	perennial	0.02547939	0.12980581	3.45E-05	26.3543955	26.3548318	0.00013576
Onagraceae	perennial	0.01116725	0.47536547	0.00029177	25.5988822	25.9113943	0.00031558
Orobanchaceae	perennial	0.04580571	0.36440144	0.0001489	26.1907864	26.2268877	0.00020935
Panicoideae	perennial	0.0407256	10.1067817	0.00165495	29.6247791	29.6269721	8.18E-05
Polemoniaceae	perennial	0.01145944	0.07125677	4.05E-05	28.8512318	28.8583737	0.00028402
Pooideae	perennial	0.03070636	9.27369114	0.00549692	21.7025115	21.7098626	0.00029637
Primulaceae	perennial	0.01104393	0.22886667	0.00011736	20.0237445	20.0274335	0.00025704
Rubieae	perennial	0.02879279	11.3357708	0.00233061	24.2344206	24.2428943	0.00010212
Salvia	perennial	0.01330184	0.12517184	4.68E-05	27.1876332	27.1876988	0.00018666
Solanaceae	perennial	0.01382659	0.16530149	7.87E-05	25.6218135	25.6218136	0.00023809
Spermacoceae	perennial	0.06163745	0.11487522	1.30E-05	29.1761336	29.1763155	0.0001138
Thelypodieae	perennial	0.07627419	0.0634584	7.21E-05	27.2564202	27.4590681	0.00057905

Table S4 Parameter estimates from the model averaged hOUwie fits for BIO6

Group.1	Group.2	rates	alpha	sigma.sq	theta	expected mean	expected var
Alysseae	annual	0.05161333	6.22818656	0.00420731	-2.5872065	-2.6130718	0.00035728
Antirrhineae	annual	0.03153751	0.05956301	4.77E-05	4.16352647	4.16319215	0.00040351
Apioideae	annual	0.01369082	0.11671906	5.17E-05	2.79702488	0.0871027	0.00036986
Arabideae	annual	1.57546449	1.02115052	0.00222512	-8.9057323	-9.3703577	0.0010899
Balsamiaceae	annual	0.01404574	0.00331545	2.63E-05	4.33322988	5.0580273	0.00160415
Brassicaceae	annual	0.05940327	8.37844032	0.00515641	2.79205995	2.79147376	0.00031426
Cardamineae	annual	0.03710529	14.9016984	0.00896339	-0.8557734	-0.9579275	0.00031157
Cardueae	annual	0.07951689	0.04745138	5.89E-05	24.2413272	5.22621163	0.00075799
CES	annual	0.08983146	0.00061035	4.97E-05	-6.9837056	-8.0944107	0.00108717
Chamaecrista	annual	0.0776548	0.06377404	1.31E-05	17.7269466	17.5173651	0.00010645
Croton	annual	0.04789096	0.08200858	0.00012471	0.35893374	5.81302847	0.00067711
Erysimeae	annual	0.18334152	0.130955	0.00021388	-5.4326107	-5.4313851	0.00099315
Euclidiaceae	annual	0.04332979	0.78484052	0.00137342	-9.4705188	-9.5720676	0.00107547
Eumalvoideae	annual	0.04499692	0.0400512	4.37E-05	10.7729575	9.68704456	0.00054352
Gesneriaceae	annual	0.01200571	1.80E-05	1.86E-05	32.2990803	11.351057	0.00128112
Grewioideae	annual	0.0188415	0.03116208	2.40E-05	14.1142749	14.2676253	0.00038977
Heliophileae	annual	0.03543767	0.72214292	6.28E-05	4.42898155	4.42874101	6.42E-05
Hypericum	annual	0.08505912	0.38813508	0.00039905	3.66568345	3.60648487	0.0005244
Lepidieae	annual	0.24167275	0.15644081	0.00047588	1.37135046	1.53084075	0.00201487
Lupinus	annual	0.0298838	8.05E-05	1.85E-05	2.92253971	2.92250733	0.00037004
Lysimachieae	annual	0.03317461	0.01845862	1.65E-05	4.78979231	-0.226402	0.00108976
Onagraceae	annual	0.0729175	0.32771862	0.00056161	1.74824217	1.74069861	0.00086319
Orobanchaceae	annual	0.05366978	0.3059429	0.00059156	0.34673511	-0.2261732	0.00096534
Panicoideae	annual	0.02806071	0.89663704	0.00069173	11.7845865	11.7886472	0.00037604
Polemoniaceae	annual	0.01359697	0.03724123	3.41E-05	0.06272615	0.07136543	0.00062239
Pooideae	annual	0.03461644	7.60060832	0.00550049	0.55533901	0.46764762	0.00036478
Primulaceae	annual	0.02774153	1.80320897	0.00309142	-8.8019942	-8.8019938	0.00075187
Rubieae	annual	0.12070004	14.8097802	0.00561357	2.15523062	2.15510356	0.00019313
Salvia	annual	0.01857804	0.08850728	7.58E-05	4.04848497	3.96820796	0.00042913
Solanaceae	annual	0.03417268	0.11593327	0.00015636	7.97218075	8.47110923	0.00067372
Spermacoceae	annual	0.03577035	0.1393921	0.00014899	14.4334213	14.0807734	0.00052781
Thelypodieae	annual	0.03118705	0.76067528	0.00024656	2.44353163	1.62625784	0.00014893
Alysseae	perennial	0.02680039	6.22818656	0.00449874	-3.0347174	-3.0141286	0.00036718
Antirrhineae	perennial	0.01118818	0.05956301	5.19E-05	4.15231742	4.15845512	0.00042346
Apioideae	perennial	0.01391388	0.11671906	0.00019408	-3.4906913	-3.4356057	0.00082635
Arabideae	perennial	0.2551859	1.02115052	0.0022278	-10.24818	-10.241348	0.00109115
Balsamiaceae	perennial	0.01467325	0.00331545	7.37E-05	1534.9123	9.94250783	0.00229979
Brassicaceae	perennial	0.02528941	8.37844032	0.005576	0.97804292	0.99501929	0.00032824
Cardamineae	perennial	0.03890158	14.9016984	0.04083057	-6.4841025	-6.4837457	0.00136872
Cardueae	perennial	0.03683252	0.04745138	0.00011318	-2.846125	-0.395766	0.00104146
CES	perennial	0.02897703	0.00061035	3.21E-05	-8.0927916	-8.0954344	0.00099018
Chamaecrista	perennial	0.00983694	0.06377404	1.32E-05	17.395518	17.3991579	0.0001079
Croton	perennial	0.01063973	0.08200858	4.48E-05	15.6573085	15.274565	0.00028631
Erysimeae	perennial	0.02610273	0.130955	0.00023434	-5.4284971	-5.4285068	0.00097366
Euclidiaceae	perennial	0.04535073	0.78484052	0.00170168	-16.337683	-15.828586	0.00113395
Eumalvoideae	perennial	0.01453831	0.0400512	4.36E-05	9.67899705	9.67982439	0.0005434
Gesneriaceae	perennial	0.00320575	1.80E-05	1.73E-05	18.2306078	11.3302853	0.00124577
Grewioideae	perennial	0.00187511	0.03116208	2.82E-05	14.723028	14.681001	0.00044835
Heliophileae	perennial	0.02302884	0.72214292	9.40E-05	4.03422465	4.17033371	6.92E-05
Hypericum	perennial	0.01869075	0.38813508	0.00037287	3.41154958	3.42875815	0.00052235
Lepidieae	perennial	0.20581917	0.15644081	0.00033798	2.06311666	1.82117735	0.00162877
Lupinus	perennial	0.07971378	8.05E-05	0.00020486	2.92213576	2.92224044	0.00116014
Lysimachieae	perennial	0.02647578	0.01845862	7.57E-05	-0.2681844	-0.2653882	0.00142268
Onagraceae	perennial	0.00338222	0.32771862	0.00056695	2.55685637	2.55235806	0.0008643
Orobanchaceae	perennial	0.04425846	0.3059429	0.00059516	-3.2859605	-3.0132383	0.00097497
Panicoideae	perennial	0.04004537	0.89663704	0.00081318	11.8072231	11.8068683	0.00047584
Polemoniaceae	perennial	0.01081812	0.03724123	0.00010675	0.22643204	0.15817461	0.00127746
Pooideae	perennial	0.03306141	7.60060832	0.0186809	-6.3391051	-6.3288309	0.00122822
Primulaceae	perennial	0.01066659	1.80320897	0.00261848	-8.7184746	-8.7184746	0.00072935
Rubieae	perennial	0.01063675	14.8097802	0.01562851	-2.2668226	-2.2582081	0.00052696
Salvia	perennial	0.01315338	0.08850728	7.72E-05	3.92992893	3.93018933	0.00043193
Solanaceae	perennial	0.01372745	0.11593327	0.00015632	9.1404873	9.12695341	0.0006736
Spermacoceae	perennial	0.01355562	0.1393921	0.00013589	8.69078007	9.93863497	0.0004926
Thelypodieae	perennial	0.08701517	0.76067528	0.00021697	-3.8061756	-3.7637158	0.00014794

Table S5 Parameter estimates from the model averaged hOUwie fits for BIO12

Group.1	Group.2	rates	alpha	sigma.sq	theta	expected mean	expected var
Alysseae	annual	0.04737243	0.20819149	0.04821967	515.233724	520.845008	0.11931237
Antirrhineae	annual	0.03270945	0.07240906	0.05400553	410.490149	412.728464	0.37246154
Apioidae	annual	0.01655018	0.10902763	0.07480959	600.605142	615.642547	0.34309049
Arabideae	annual	10.5059625	10.0883102	5.37488864	607.404663	608.118428	0.30136072
Balsamiaceae	annual	0.01408315	0.06439439	0.02217034	970.496073	1060.84788	0.17567393
Brassicaceae	annual	0.0589668	1.76016765	1.31409528	492.717113	492.584541	0.37679678
Cardamineae	annual	0.03248418	0.53738209	0.21357371	862.892542	860.464327	0.19984715
Cardueae	annual	0.07146612	0.08485246	0.02860879	556.030133	555.226047	0.17498418
CES	annual	0.10051921	0.0897381	0.08183852	318.204754	316.975313	0.67019208
Chamaecrista	annual	0.09882294	0.04823854	0.00645252	1288.22694	1285.88771	0.10203044
Croton	annual	0.0657443	0.07057981	0.19837714	1259.94596	1263.75014	0.96853921
Erysimeae	annual	0.18059134	0.33982324	0.1062191	441.109953	459.592067	0.15821803
Euclidiaceae	annual	0.04122487	0.10512365	0.02499272	226.192034	226.189226	0.1351553
Eumalvoideae	annual	0.05066802	0.05628234	0.18044721	634.539604	652.647046	1.30019166
Gesneriaceae	annual	0.00933779	0.00586886	0.00540275	2401.60746	1754.24081	0.31425156
Grewioideae	annual	0.02251709	0.01408937	0.01068491	722.609891	989.06991	0.33630006
Heliophilleae	annual	0.03311223	0.19296797	0.08350208	243.426276	243.520266	0.24173503
Hypericum	annual	0.08401337	3.0114711	0.6776461	1216.79566	1216.86001	0.11949485
Lepidieae	annual	0.2466082	14.5832526	6.02475324	393.737997	393.860982	0.20732368
Lupinus	annual	0.0297662	0.06025797	0.05970691	562.62679	625.787037	0.40368399
Lysimachieae	annual	0.02842698	0.11347005	0.0110182	969.797239	966.581562	0.09253496
Onagraceae	annual	0.39683951	0.02167004	0.09018649	954.557296	952.29553	1.42189999
Orobanchaceae	annual	0.04945723	0.07389371	0.04647261	730.129648	706.770783	0.33064432
Panicoideae	annual	0.02474128	0.48334241	0.247008	1035.40849	1049.03123	0.25616232
Polemoniaceae	annual	0.01148871	0.01947166	0.02355574	39.6677214	143.598729	0.53311352
Pooideae	annual	0.02238177	8.59686616	2.64449224	583.224332	583.224332	0.15427025
Primulaceae	annual	0.03370578	0.20251442	0.00363834	424.745044	473.130039	0.04871923
Rubieae	annual	0.04086928	0.5448742	0.01326983	577.69731	611.146904	0.03277425
Salvia	annual	0.02865751	0.05890604	1.66478395	532.772536	567.133825	5.73621352
Solanaceae	annual	0.03071688	0.11665591	0.19142686	511.278857	665.148487	0.81962612
Spermacoceae	annual	0.03606006	0.05363067	0.02618234	1238.42687	1218.88448	0.24925646
Thelypodieae	annual	0.03025708	0.28845223	0.29293827	656.824222	541.813074	0.52192279
Alysseae	perennial	0.02317844	0.20819149	0.03804949	579.780784	570.514228	0.0983292
Antirrhineae	perennial	0.01227838	0.07240906	0.0632659	505.82864	458.96603	0.41929557
Apioidae	perennial	0.01301137	0.10902763	0.07482765	634.694502	634.445528	0.34315586
Arabideae	perennial	1.48285992	10.0883102	5.4521792	613.045861	613.041922	0.27675403
Balsamiaceae	perennial	0.01451376	0.06439439	0.02015306	1871.70662	1679.55734	0.15954815
Brassicaceae	perennial	0.02160555	1.76016765	1.29222597	416.796016	420.584472	0.36448539
Cardamineae	perennial	0.03955619	0.53738209	0.28257672	852.276083	852.355688	0.26755142
Cardueae	perennial	0.01769078	0.08485246	0.05928923	556.051389	555.551978	0.2925052
CES	perennial	0.03118811	0.0897381	0.10409495	316.056617	316.120842	0.7323502
Chamaecrista	perennial	0.01088525	0.04823854	0.00972918	1284.65185	1284.67505	0.11594419
Croton	perennial	0.00382829	0.07057981	0.03191024	1267.62649	1267.47535	0.30310253
Erysimeae	perennial	0.02581131	0.33982324	0.10191942	490.226032	489.919729	0.15299116
Euclidiaceae	perennial	0.04698327	0.10512365	0.18484741	220.197295	226.330659	0.71344613
Eumalvoideae	perennial	0.01704625	0.05628234	0.05717853	673.317734	670.450098	0.58206823
Gesneriaceae	perennial	0.00225536	0.00586886	0.00597045	1704.92509	1693.48979	0.32379055
Grewioideae	perennial	0.0033909	0.01408937	0.01036084	1366.88548	1323.32213	0.32981363
Heliophilleae	perennial	0.02190553	0.19296797	0.06775391	467.928166	385.223352	0.21372747
Hypericum	perennial	0.01755665	3.0114711	0.23064585	1380.56798	1380.5384	0.03965665
Lepidieae	perennial	0.22744216	14.5832526	6.02021216	398.185235	398.029268	0.20592134
Lupinus	perennial	0.08012825	0.06025797	0.09324341	4292.69077	1012.19252	0.52254639
Lysimachieae	perennial	0.02461495	0.11347005	0.03375462	963.492792	963.560334	0.16066922
Onagraceae	perennial	0.19986618	0.02167004	0.13556119	956.241676	955.842784	1.52437791
Orobanchaceae	perennial	0.04446025	0.07389371	0.0555584	606.228458	642.711882	0.38035432
Panicoideae	perennial	0.04163422	0.48334241	0.24577139	1093.43089	1092.4182	0.25484125
Polemoniaceae	perennial	0.01023562	0.01947166	0.0247927	1015.12253	356.753845	0.54782084
Pooideae	perennial	0.02824956	8.59686616	5.69766657	583.224333	583.224333	0.33126481
Primulaceae	perennial	0.00759099	0.20251442	0.11394444	740.85253	727.995877	0.27999627
Rubieae	perennial	0.04769792	0.5448742	0.17420824	746.603781	743.041502	0.15812164
Salvia	perennial	0.01275457	0.05890604	0.05316311	575.924195	575.922976	0.83698316
Solanaceae	perennial	0.01689401	0.11665591	0.19105004	729.618851	752.517491	0.81823637
Spermacoceae	perennial	0.01306143	0.05363067	0.04043872	1000.56226	1097.78395	0.3387305
Thelypodieae	perennial	0.08492402	0.28845223	0.27379223	339.642254	343.354377	0.48334722

Table S6 Parameter estimates from the model averaged hOUwie fits for BIO14

Group.1	Group.2	rates	alpha	sigma.sq	theta	expected mean	expected var
Alysseae	annual	0.04579259	0.47798098	0.48552629	9.9509342	10.0914011	0.51430865
Antirrhineae	annual	0.03415206	0.24270092	0.51299472	6.59550892	6.60005843	1.05972644
Apioidae	annual	0.01662286	0.13450909	0.33430538	10.7888516	10.5621439	1.242724
Arabideae	annual	1.75095961	7.13680715	12.3092249	13.303918	13.4428904	0.86253332
Balsamiaceae	annual	0.01397567	0.10438049	0.18847685	13.2250231	14.024651	0.91156299
Brassicaceae	annual	0.05477588	0.33993062	0.6134576	8.48687684	8.47316861	0.9020602
Cardamineae	annual	0.032016	5.10328054	7.85332442	27.2031202	27.1629205	0.77100091
Cardueae	annual	0.06311925	0.11819022	0.25717259	7.93199866	8.18382079	1.08767445
CES	annual	0.26964558	0.15524033	0.18166066	9.40973286	8.97862281	0.83748149
Chamaecrista	annual	0.08640687	0.06312635	0.09218532	15.4731671	15.5129028	0.80729012
Croton	annual	0.14998827	0.14082145	0.28026217	22.3380453	21.3961722	0.99944581
Erysimeae	annual	0.17207479	0.73359004	1.34351187	9.79397017	9.73528345	0.91958202
Euclidiaceae	annual	0.04217904	0.09874811	0.11277588	3.36190769	3.3638688	0.55111196
Eumalvoideae	annual	0.04172981	0.0772997	0.15664278	4.5435306	6.11844567	1.01302429
Gesneriaceae	annual	0.00439606	0.02525216	0.05538558	30.4554998	31.247659	1.07526829
Grewioideae	annual	0.017218	0.05160354	0.11907702	5.83801168	7.07659271	1.15756398
Heliophileae	annual	0.03554063	0.03527601	0.045307	7.56826034	7.56826037	0.38233642
Hypericum	annual	0.09900478	0.63522607	0.71258968	27.9872035	28.2061366	0.57292021
Lepidieae	annual	0.27649931	1.71090885	3.07276909	8.29814105	8.31073899	0.90678868
Lupinus	annual	0.02734713	0.00204536	0.12015314	8.78293089	8.86029821	1.65303628
Lysimachieae	annual	0.04871493	0.37000828	0.35028624	12.2859542	13.9443554	0.47584819
Onagraceae	annual	0.06849037	2.62375144	5.16135105	6.73775487	6.8316547	0.98358232
Orobanchaceae	annual	0.04351292	5.90084035	12.11917	13.3759506	13.3745486	1.0299938
Panicoideae	annual	0.02188394	9.91761498	15	12.7132505	12.714649	0.75623093
Polemoniaceae	annual	0.01190267	0.08065316	0.10943205	4.04979968	4.29508993	0.68488172
Pooideae	annual	0.02183113	7.97966766	15	9.5025711	9.57202901	0.93988877
Primulaceae	annual	0.03226997	0.18388311	0.45658066	9.69604876	9.71603307	1.24200741
Rubieae	annual	0.05232785	1.17350003	2.31212842	7.79785992	8.49551689	0.97091258
Salvia	annual	0.04507623	0.04112045	0.12576575	8.17490282	8.11720532	1.42247451
Solanaceae	annual	0.01689352	0.17648081	0.42858963	6.80269218	9.15145633	1.18876228
Spermacoceae	annual	0.03242268	0.01405353	0.07047834	7.15587134	10.2375225	1.84542428
Thelypodieae	annual	0.03439999	0.0160098	0.35180244	5.30243797	5.05586878	2.05078883
Alysseae	perennial	0.02561623	0.47798098	0.49790275	12.4415605	12.3116039	0.52624369
Antirrhineae	perennial	0.01193103	0.24270092	0.5156674	6.98042699	6.88094423	1.06624138
Apioidae	perennial	0.01356522	0.13450909	0.33430401	10.2279576	10.2320775	1.24271999
Arabideae	perennial	0.27782878	7.13680715	12.3001201	14.2696304	14.2675431	0.86222939
Balsamiaceae	perennial	0.01531837	0.10438049	0.18619607	27.860556	25.2679439	0.89776156
Brassicaceae	perennial	0.02769703	0.33993062	0.61357049	6.66054602	6.97911116	0.9024216
Cardamineae	perennial	0.03783889	5.10328054	7.85333359	26.174041	26.1743258	0.77104292
Cardueae	perennial	0.03938396	0.11819022	0.25722806	8.61387148	8.55311593	1.08786262
CES	perennial	0.04409831	0.15524033	0.1951037	8.51454294	8.5419729	0.86292059
Chamaecrista	perennial	0.01085283	0.06312635	0.09696641	15.5104573	15.5105721	0.86454123
Croton	perennial	0.03595118	0.14082145	0.2747635	20.5121542	20.5238386	0.97835386
Erysimeae	perennial	0.02732867	0.73359004	1.34366493	9.5409786	9.54214389	0.91991508
Euclidiaceae	perennial	0.05597158	0.09874811	0.11686561	3.39611739	3.38736917	0.56852722
Eumalvoideae	perennial	0.01216178	0.0772997	0.15654563	9.20691145	8.79779358	1.01253657
Gesneriaceae	perennial	0.00249704	0.02525216	0.05382633	31.5242881	31.5495104	1.0542478
Grewioideae	perennial	0.00173364	0.05160354	0.10964436	20.5083508	19.0210843	1.07327493
Heliophileae	perennial	0.02304538	0.03527601	0.03994513	17.5842476	9.9381081	0.37277583
Hypericum	perennial	0.01491198	0.63522607	0.07844782	59.463865	57.103958	0.06760869
Lepidieae	perennial	0.21766085	1.71090885	2.67169604	8.43403409	8.41705845	0.78448221
Lupinus	perennial	0.06808381	0.00204536	0.40852831	11.4604872	9.12873959	2.80868967
Lysimachieae	perennial	0.02524198	0.37000828	0.35031334	21.3256514	21.1974096	0.47590472
Onagraceae	perennial	0.00193533	2.62375144	5.16135105	24.7771196	24.7621258	0.98358232
Orobanchaceae	perennial	0.04431145	5.90084035	12.126715	13.3227365	13.322738	1.03114656
Panicoideae	perennial	0.03429727	9.91761498	15	16.5899866	16.5904226	0.75623093
Polemoniaceae	perennial	0.01170706	0.08065316	0.14545828	14.8172803	10.4108599	0.87436157
Pooideae	perennial	0.03047146	7.97966766	15	17.0460389	17.0333096	0.93988877
Primulaceae	perennial	0.01208718	0.18388311	0.45738327	9.741042	9.74052118	1.24384541
Rubieae	perennial	0.04250172	1.17350003	2.36764626	16.1437052	15.9928824	1.01511516
Salvia	perennial	0.01256396	0.04112045	0.12576802	8.08740665	8.09385121	1.42252247
Solanaceae	perennial	0.01383322	0.17648081	0.36442223	18.2393939	18.0283888	1.03435575
Spermacoceae	perennial	0.01776849	0.01405353	0.07153936	11.3450197	11.2982585	1.86078232
Thelypodieae	perennial	0.08706407	0.0160098	0.03774245	5.0502574	5.05519723	0.60973126

Table S7 Parameter estimates from the model averaged hOUwie fits for BIO15

Group.1	Group.2	rates	alpha	sigma.sq	theta	expected mean	expected var
Alysseae	annual	0.04378608	2.13850345	0.46763675	44.6338786	44.6038733	0.11262597
Antirrhineae	annual	0.03372723	0.22175491	0.07540967	51.1135599	51.1235697	0.16993306
Apioidae	annual	0.01412433	0.11162976	0.06055915	45.4198392	47.5607071	0.27139224
Arabideae	annual	0.65368158	8.94282157	3.42358735	45.9269541	45.9181889	0.19142823
Balsamiaceae	annual	0.01491422	0.05322773	0.01526969	63.9284512	63.2497237	0.14428678
Brassicaceae	annual	0.05721943	1.24043227	0.67799626	45.5538977	45.5556989	0.27514224
Cardamineae	annual	0.02936977	0.43801139	0.17261584	35.9267652	36.0347586	0.20407219
Cardueae	annual	0.05806122	0.18148917	0.04698407	48.1409986	48.4722471	0.12952768
CES	annual	0.09189669	0.01040016	0.0134917	54.8359681	55.0637738	0.42128873
Chamaecrista	annual	0.09217477	0.00349425	0.00627452	57.6550366	48.2869124	0.1696715
Croton	annual	0.02436305	0.15985228	0.06077946	32.3514008	39.0265804	0.1832457
Erysimeae	annual	0.18234183	2.02076521	0.82082664	45.8866138	46.0451014	0.18591706
Euclidiaceae	annual	0.04168759	0.09995358	0.06692274	63.2240541	63.2284362	0.47444223
Eumalvoideae	annual	0.0491412	0.09137134	0.00616466	69.6805507	69.1502102	0.05506522
Gesneriaceae	annual	0.00358917	0.04584437	0.01611679	54.6190547	54.5101167	0.17579113
Grewioideae	annual	0.01976282	0.06982646	0.00766736	80.3547339	77.7308253	0.05562106
Heliophileae	annual	0.03680605	0.14277521	0.04783703	45.2762252	45.2757689	0.30145577
Hypericum	annual	0.10033518	0.21882122	0.12442934	27.6950926	27.3387598	0.27752427
Lepidieae	annual	0.24903137	2.29896517	1.06967053	47.7279663	47.5693626	0.23158558
Lupinus	annual	0.02967714	0.04093387	0.03023619	46.6765906	46.6737109	0.28734436
Lysimachieae	annual	0.03009999	0.12299691	0.00949672	61.7952608	52.1695755	0.09018851
Onagraceae	annual	0.07922162	0.23355981	0.14765297	63.1929697	63.1855445	0.31580209
Orobanchaceae	annual	0.04711804	0.37223064	0.19990937	46.5125465	46.7670322	0.268549
Panicoideae	annual	0.02090337	9.51001499	3.00651428	65.7785569	65.7257723	0.15807046
Polemoniaceae	annual	0.01127168	0.06905906	0.01742792	53.5377775	53.5221929	0.1329685
Pooideae	annual	0.02274741	7.86548183	3.74703147	46.5796933	46.4778832	0.23815354
Primulaceae	annual	0.0227563	0.09761794	0.02988087	58.9528172	58.703151	0.20198982
Rubieae	annual	0.07596755	0.63042086	0.22932493	49.2887668	48.8010052	0.17998085
Salvia	annual	0.02433589	0.1049853	0.00563725	65.2748799	64.351494	0.09464866
Solanaceae	annual	0.03319608	0.22093706	0.09399433	61.1618086	59.6182792	0.21087085
Spermacoceae	annual	0.03715827	0.06165751	0.0224194	67.3608595	66.9352549	0.18361977
Thelypodieae	annual	0.02845831	0.02554676	0.03513655	59.9337805	59.1609533	0.38825591
Alysseae	perennial	0.02355089	2.13850345	0.46433081	44.1298154	44.1470453	0.10804074
Antirrhineae	perennial	0.01247936	0.22175491	0.08015895	51.8470419	51.661791	0.18138313
Apioidae	perennial	0.01350335	0.11162976	0.06057906	50.3990329	50.3670744	0.2714637
Arabideae	perennial	0.14104669	8.94282157	3.42358789	45.8690971	45.8688795	0.19142835
Balsamiaceae	perennial	0.01234129	0.05322773	0.01631923	57.2302199	58.789703	0.15279054
Brassicaceae	perennial	0.02125496	1.24043227	0.54310231	46.0897561	46.0416265	0.22025939
Cardamineae	perennial	0.03796391	0.43801139	0.23265672	36.2660851	36.2622901	0.26891698
Cardueae	perennial	0.0196643	0.18148917	0.04748735	49.9004093	49.7022049	0.13089321
CES	perennial	0.02919222	0.01040016	0.01954551	55.1218605	55.0930156	0.45449213
Chamaecrista	perennial	0.01116501	0.00349425	0.00539632	48.594263	48.57248	0.17337735
Croton	perennial	0.00498416	0.15985228	0.05019135	57.7880607	57.4827946	0.15721404
Erysimeae	perennial	0.02781484	2.02076521	0.85160484	48.0497799	48.0463584	0.21413506
Euclidiaceae	perennial	0.04373934	0.09995358	0.09841652	63.3699991	63.3476004	0.57480906
Eumalvoideae	perennial	0.01325843	0.09137134	0.0256599	68.352852	68.4466995	0.13614075
Gesneriaceae	perennial	0.00254688	0.04584437	0.01615284	54.3060305	54.2927852	0.176156
Grewioideae	perennial	0.00180731	0.06982646	0.01823636	55.035188	56.4576795	0.12787361
Heliophileae	perennial	0.02387937	0.14277521	0.07500505	45.1016221	45.1560854	0.34996531
Hypericum	perennial	0.01532457	0.21882122	0.04701878	25.5684266	25.9791231	0.12917329
Lepidieae	perennial	0.21589796	2.29896517	0.98079118	46.280477	46.4951824	0.21619924
Lupinus	perennial	0.07455664	0.04093387	0.11066089	44.7449689	46.6546953	0.56394118
Lysimachieae	perennial	0.02615461	0.12299691	0.04818991	44.9787417	45.138593	0.19503272
Onagraceae	perennial	0.00342103	0.23355981	0.21365964	62.8869461	62.9021519	0.47123427
Orobanchaceae	perennial	0.04214628	0.37223064	0.19945829	48.2175298	48.1151881	0.26801508
Panicoideae	perennial	0.04139276	9.51001499	3.00651428	54.542389	54.5628577	0.15807046
Polemoniaceae	perennial	0.0110541	0.06905906	0.04797808	53.2298641	53.3349363	0.30786256
Pooideae	perennial	0.03194115	7.86548183	3.74729576	39.1310502	39.1398069	0.23832517
Primulaceae	perennial	0.02759849	0.09761794	0.07577813	58.3878572	58.3986934	0.27562567
Rubieae	perennial	0.03582593	0.63042086	0.26169783	46.4002425	46.4515327	0.21011538
Salvia	perennial	0.01389107	0.1049853	0.03814369	64.0361411	64.0393556	0.18099799
Solanaceae	perennial	0.01338455	0.22093706	0.08263792	54.9069813	54.9853456	0.18712184
Spermacoceae	perennial	0.01284506	0.06165751	0.02612719	60.9882376	63.540684	0.20485035
Thelypodieae	perennial	0.08355172	0.02554676	0.03295988	58.5349776	58.6836054	0.37862128

Table S8 Parameter estimates from the model averaged hOUwie fits for AI

Group.1	Group.2	rates	alpha	sigma.sq	theta	expected mean	expected var
Alysseae	annual	0.04741912	0.38185637	0.16395818	0.38496298	0.38680036	0.21213213
Antirrhineae	annual	0.03300114	0.05592467	0.06637453	0.24546177	0.24757722	0.59739377
Apioidae	annual	0.01272887	0.08639321	0.09000746	0.32564161	0.4333541	0.52083635
Arabideae	annual	6.71605987	13.2761943	6.84479096	0.56077937	0.57307342	0.25928284
Balsamiaceae	annual	0.01514862	0.4447766	0.11573094	0.91051857	0.91945291	0.12988799
Brassicaceae	annual	0.05482146	4.47560605	5.86102179	0.32844235	0.32841307	0.65533017
Cardamineae	annual	0.0263482	7.88857953	2.49072211	0.75645611	0.76613676	0.15832056
Cardueae	annual	0.07430414	0.12069729	0.07107648	0.40347295	0.40343534	0.3026533
CES	annual	0.1055719	0.2152754	0.17490966	0.23474495	0.235634	0.45585831
Chamaecrista	annual	0.09298248	0.01037084	0.00544259	0.84222147	0.84571574	0.17153597
Croton	annual	0.3487838	0.09015602	0.51193033	0.68061433	0.73109794	1.9698587
Erysimeae	annual	0.1641971	0.46829282	0.25067817	0.37996341	0.3808037	0.27214973
Euclidiaceae	annual	0.04172836	0.83170587	0.25643256	0.15109421	0.15160889	0.29402523
Eumalvoideae	annual	0.44474892	0.06583692	0.14033964	0.33734537	0.3591446	1.03197494
Gesneriaceae	annual	0.00282602	0.03530129	0.0039124	1.50023931	1.29835025	0.08969555
Grewioideae	annual	0.01842587	0.02340999	0.02914529	0.43346657	0.56883783	0.5637227
Heliophileae	annual	0.03480187	0.29542962	0.15327667	0.11494827	0.11498846	0.29686255
Hypericum	annual	0.08828198	0.51092575	0.25970734	0.9175962	0.9246502	0.24900597
Lepidieae	annual	0.22317806	13.3117024	9.95676983	0.23365704	0.23396872	0.37664908
Lupinus	annual	0.03089709	0.03150713	0.08740679	0.36252961	0.40667594	0.76877484
Lysimachieae	annual	0.0446519	0.12977973	0.02745905	0.66690291	0.73395597	0.10570229
Onagraceae	annual	0.09629999	0.01888626	0.22306228	1.58921687	0.74529052	3.00112032
Orobanchaceae	annual	0.04708388	0.1313756	0.14272336	0.52534545	0.5190375	0.55209252
Panicoideae	annual	0.02900031	3.39489086	2.51189256	0.57060973	0.57204269	0.36995191
Polemoniaceae	annual	0.01167439	0.03120088	0.03792434	0.14400596	0.14955336	0.58897847
Pooideae	annual	0.0202752	2.3078675	1.82053275	0.38629531	0.39451518	0.39445122
Primulaceae	annual	0.03031071	0.26184249	0.15220615	0.62981548	0.64549154	0.29090594
Rubieae	annual	0.0437942	1.9529575	0.74208245	0.41998133	0.43302712	0.18989197
Salvia	annual	0.02424448	0.04983273	0.04265632	0.22757194	0.32798969	0.64320078
Solanaceae	annual	0.0212215	0.08909914	0.21344954	0.47464643	0.49185838	1.2711778
Spermacoceae	annual	0.03614699	0.03330834	0.03165154	0.66272183	0.65808407	0.46702192
Thelypodieae	annual	0.02820513	0.08249061	0.16148059	0.27164384	0.25040851	0.95179418
Alysseae	perennial	0.0259828	0.38185637	0.19055552	0.41248532	0.41049499	0.25207993
Antirrhineae	perennial	0.01305015	0.05592467	0.09786566	0.33171154	0.27992355	0.79199162
Apioidae	perennial	0.01339697	0.08639321	0.09000812	0.56104836	0.55853994	0.52083972
Arabideae	perennial	0.94544963	13.2761943	6.85569163	0.67105727	0.67083895	0.25941705
Balsamiaceae	perennial	0.01332795	0.4447766	0.11650805	1.28510119	1.26085942	0.13349789
Brassicaceae	perennial	0.01996196	4.47560605	5.85491488	0.29661768	0.29756153	0.65066565
Cardamineae	perennial	0.03674209	7.88857953	2.48887785	0.92347171	0.92330596	0.15719276
Cardueae	perennial	0.01594176	0.12069729	0.14179715	0.4034354	0.40343542	0.5213694
CES	perennial	0.03109798	0.2152754	0.17711983	0.23702377	0.23697127	0.45370278
Chamaecrista	perennial	0.01308412	0.01037084	0.00718498	0.84640334	0.84637807	0.18420053
Croton	perennial	0.00520383	0.09015602	0.04584149	0.7706868	0.76631665	0.41315199
Erysimeae	perennial	0.02629642	0.46829282	0.2540812	0.3826006	0.38258291	0.27579276
Euclidiaceae	perennial	0.04985159	0.83170587	1.69564046	0.28977824	0.28108604	1.0628657
Eumalvoideae	perennial	0.22596614	0.06583692	0.11351424	0.36789401	0.36647704	0.88562114
Gesneriaceae	perennial	0.0024349	0.03530129	0.01030294	1.16120073	1.15773544	0.14694208
Grewioideae	perennial	0.00206782	0.02340999	0.01917063	0.84083463	0.81014619	0.41462109
Heliophileae	perennial	0.01954472	0.29542962	0.14374822	0.23146351	0.19360034	0.27538873
Hypericum	perennial	0.01477116	0.51092575	0.02165941	0.96028264	0.95859674	0.02420785
Lepidieae	perennial	0.18862287	13.3117024	9.94213578	0.24430586	0.24389481	0.37283729
Lupinus	perennial	0.07555048	0.03150713	0.12334068	38.3543687	0.74860672	0.90423352
Lysimachieae	perennial	0.02658251	0.12977973	0.02650575	0.8319011	0.8271431	0.10307907
Onagraceae	perennial	0.08027997	0.01888626	0.10015971	0.91257906	0.66438018	2.27520612
Orobanchaceae	perennial	0.04453919	0.1313756	0.14391632	0.49402435	0.49905313	0.56662628
Panicoideae	perennial	0.04008822	3.39489086	2.51189256	0.65593639	0.65522354	0.36995191
Polemoniaceae	perennial	0.01162336	0.03120088	0.03289652	1.29437833	0.34390264	0.54184284
Pooideae	perennial	0.02749956	2.3078675	1.82053275	0.59697062	0.59608758	0.39445122
Primulaceae	perennial	0.01024173	0.26184249	0.15969248	0.69025438	0.6894189	0.30677686
Rubieae	perennial	0.05130808	1.9529575	0.74247167	0.63864692	0.63598294	0.19018348
Salvia	perennial	0.01331045	0.04983273	0.06354232	0.35594196	0.35594142	0.61247128
Solanaceae	perennial	0.01452606	0.08909914	0.21376596	0.51286719	0.51241156	1.19297076
Spermacoceae	perennial	0.01183425	0.03330834	0.03574066	0.59469925	0.63138227	0.49608885
Thelypodieae	perennial	0.07986193	0.08249061	0.12528938	0.22268299	0.22625942	0.81137263

