Supporting Information

Adler et al. 10.1073/pnas.1315179111

Suggested Readings

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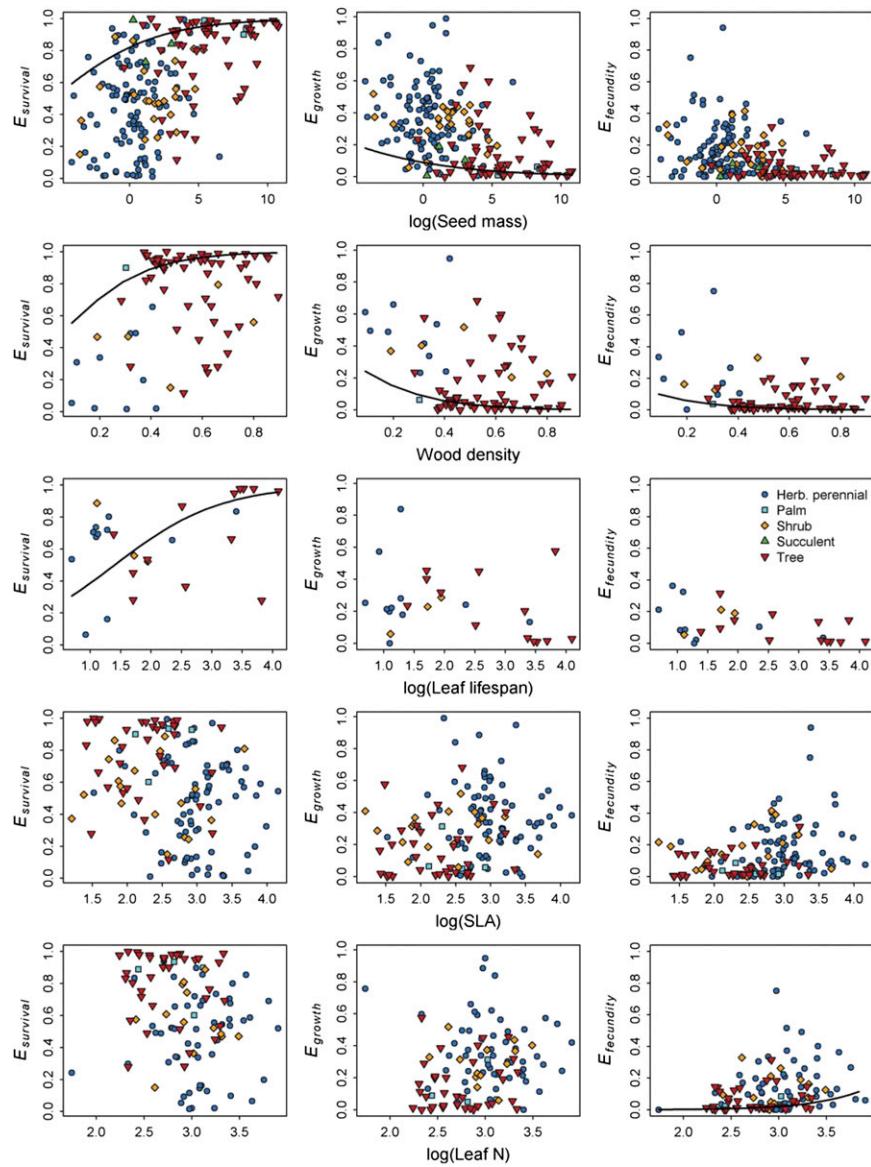
Fig. S1. Functional trait–elasticity relationships fit with phylogenetic generalized least squares (PGLS) regression. Solid lines show functional trait effects that remained significant after accounting for growth form (Table 1). Regressions were performed on logit-transformed data.
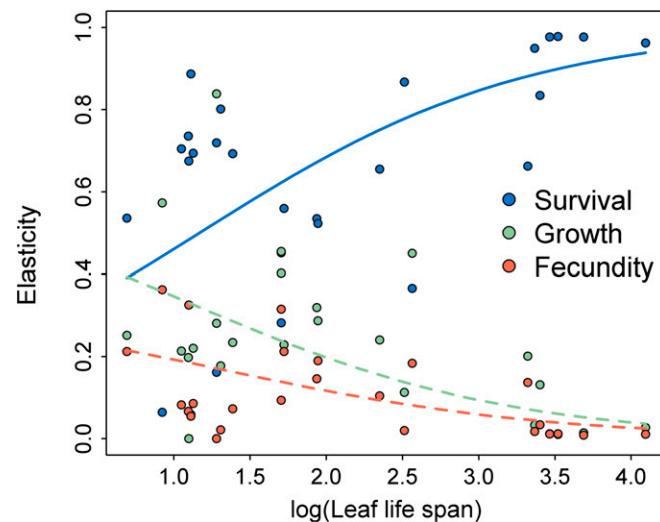
Fig. S2. Relationship between leaf lifespan and vital rate elasticities without *Pinus nigra*. Solid lines show significant functional trait effects estimated by Dirichlet regression after accounting for growth form (Table 1). Dashed lines indicate trait effects that were significant without growth form in the model but not significant when growth form was included.
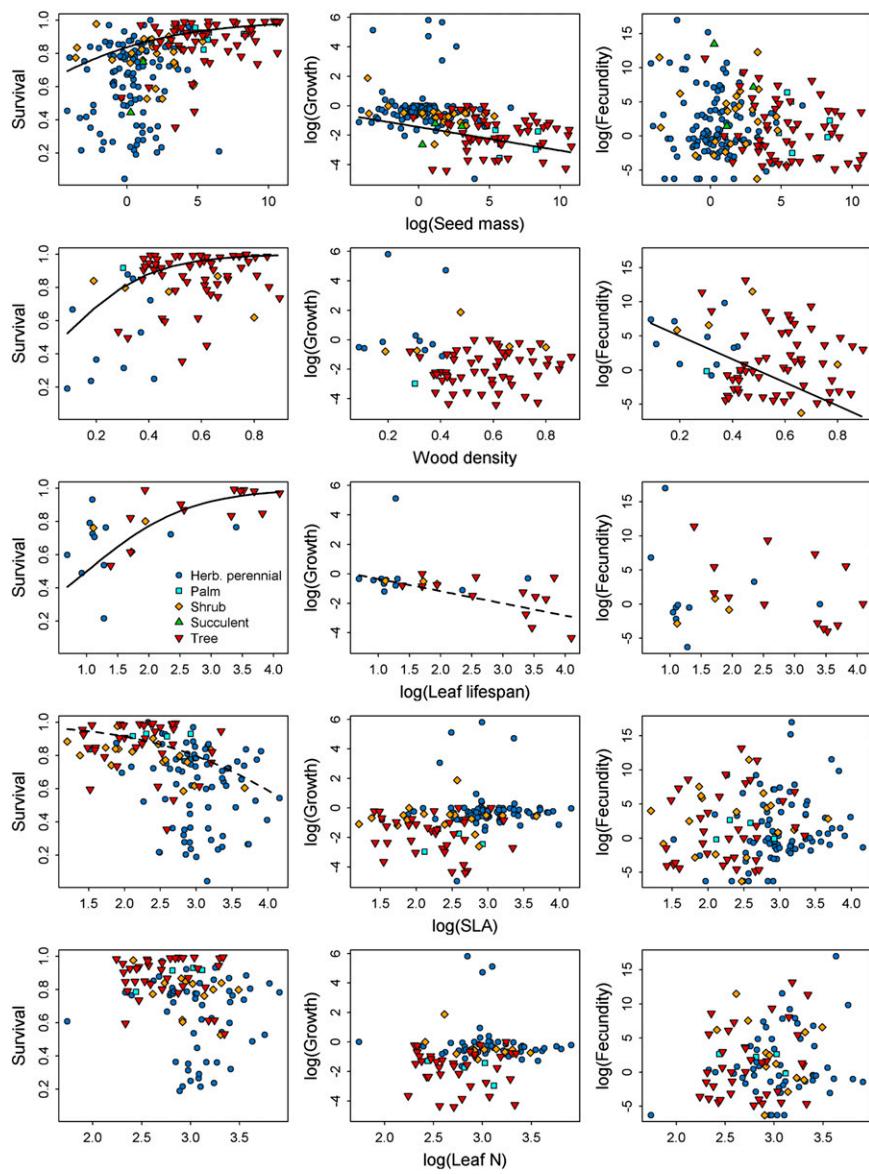
Fig. S3. Relationships between functional traits and vital rates. Solid lines show significant functional trait effects estimated by PGLS regression after accounting for growth form (Table 2). Dashed lines indicate trait effects that were significant without growth form in the model but not significant when growth form was included.

Table S1. Functional traits, growth forms, and biomes represented in the dataset of 222 species

	n
Functional trait	
Seed mass	193
Wood density	72
Leaf lifespan	27
SLA	135
Leaf N	106
Growth form	
Perennial herb	117
Palm	9
Shrub	26
Succulent	3
Tree	67
Biome	
Arctic	10
Desert	21
Temperate forest	102
Temperate grassland	28
Tropical forest	46
Tropical savanna	15
Arctic	10

n refers to the number of species. SLA, specific leaf area.

Table S2.   Dirichlet regression results for models of vital rate elasticities including growth form as a covariate

Elasticity	Parameter	Coefficient	SE	Z	P
Seed mass					
Survival	Intercept	0.122	0.109	1.119	0.263
Survival	Trait effect	0.151	0.039	3.882	0
Survival	Palm	2.484	0.503	4.94	0
Survival	Shrub	0.741	0.256	2.891	0.004
Survival	Succulent	1.795	0.685	2.62	0.009
Survival	Tree	0.505	0.257	1.962	0.05
Growth	Intercept	0.148	0.108	1.367	0.171
Growth	Trait effect	0.041	0.034	1.202	0.229
Growth	Palm	0.417	0.475	0.878	0.38
Growth	Shrub	0.473	0.25	1.89	0.059
Growth	Succulent	−0.256	0.621	−0.413	0.68
Growth	Tree	−0.744	0.243	−3.067	0.002
Fecundity	Intercept	−0.725	0.1	−7.27	0
Fecundity	Trait effect	0.047	0.034	1.389	0.165
Fecundity	Palm	0.51	0.468	1.088	0.276
Fecundity	Shrub	0.316	0.255	1.24	0.215
Fecundity	Succulent	0.122	0.603	0.203	0.84
Fecundity	Tree	−0.311	0.25	−1.245	0.213
Wood density					
Survival	Intercept	−0.346	0.458	−0.756	0.45
Survival	Trait effect	0.286	1.165	0.246	0.806
Survival	Palm	6.185	0.827	7.481	0
Survival	Shrub	0.835	0.66	1.265	0.206
Survival	Tree	1.361	0.524	2.595	0.009
Growth	Intercept	0.583	0.44	1.324	0.185
Growth	Trait effect	−0.148	0.904	−0.164	0.87
Growth	Palm	2.717	0.849	3.199	0.001
Growth	Shrub	−0.091	0.662	−0.138	0.89
Growth	Tree	−1.075	0.455	−2.36	0.018
Fecundity	Intercept	−0.209	0.417	−0.5	0.617
Fecundity	Trait effect	−0.334	0.895	−0.373	0.709
Fecundity	Palm	2.634	0.862	3.057	0.002
Fecundity	Shrub	−0.749	0.643	−1.164	0.244
Fecundity	Tree	−0.506	0.433	−1.168	0.243
Leaf lifespan					
Survival	Intercept	−0.044	0.564	−0.078	0.938
Survival	Trait effect	0.044	0.358	0.124	0.902
Survival	Shrub	1.751	0.768	2.279	0.023
Survival	Tree	1.209	0.802	1.507	0.132
Growth	Intercept	−0.266	0.528	−0.504	0.614
Growth	Trait effect	−0.51	0.366	−1.393	0.164
Growth	Shrub	1.551	0.69	2.249	0.025
Growth	Tree	1.8	0.877	2.053	0.04
Fecundity	Intercept	−1.029	0.524	−1.962	0.05
Fecundity	Trait effect	−0.333	0.325	−1.026	0.305
Fecundity	Shrub	1.956	0.681	2.871	0.004
Fecundity	Tree	1.576	0.722	2.182	0.029
SLA					
Survival	Intercept	−0.138	0.642	−0.215	0.83
Survival	Trait effect	0.048	0.208	0.234	0.815
Survival	Palm	2.575	0.593	4.345	0
Survival	Shrub	1.013	0.312	3.253	0.001
Survival	Tree	1.06	0.286	3.702	0
Growth	Intercept	−0.442	0.593	−0.746	0.456
Growth	Trait effect	0.086	0.189	0.454	0.649
Growth	Palm	0.792	0.556	1.425	0.154
Growth	Shrub	0.722	0.305	2.366	0.018
Growth	Tree	−0.326	0.278	−1.175	0.24
Fecundity	Intercept	−2.607	0.523	−4.985	0
Fecundity	Trait effect	0.571	0.175	3.267	0.001
Fecundity	Palm	0.958	0.528	1.817	0.069
Fecundity	Shrub	0.827	0.274	3.016	0.003

Table S2.   Cont.

Elasticity	Parameter	Coefficient	SE	Z	P
Fecundity	Tree	0.408	0.235	1.736	0.083
Leaf N					
Survival	Intercept	−0.348	1.066	−0.326	0.744
Survival	Trait effect	0.138	0.341	0.405	0.686
Survival	Palm	2.66	0.562	4.733	0
Survival	Shrub	1.114	0.349	3.189	0.001
Survival	Tree	1.237	0.281	4.398	0
Growth	Intercept	−0.259	1.122	−0.231	0.818
Growth	Trait effect	0.044	0.351	0.127	0.899
Growth	Palm	0.914	0.559	1.635	0.102
Growth	Shrub	0.741	0.345	2.151	0.031
Growth	Tree	−0.378	0.291	−1.298	0.194
Fecundity	Intercept	−3.321	0.874	−3.799	0
Fecundity	Trait effect	0.768	0.282	2.724	0.006
Fecundity	Palm	1.17	0.534	2.191	0.028
Fecundity	Shrub	0.501	0.318	1.577	0.115
Fecundity	Tree	0.341	0.238	1.435	0.151

For each model, the overall intercept corresponds to the herbaceous perennial growth form; the other growth form coefficients are deviations from this baseline.

Table S3.   Dirichlet regression results for models of vital rate elasticities including biome as a covariate

Elasticity	Parameter	Coefficient	SE	Z	P
Seed mass					
Survival	Intercept	0.82	0.432	1.901	0.057
Survival	Trait effect	0.18	0.037	4.912	0
Survival	Desert	−0.908	0.501	−1.811	0.07
Survival	Temperate forest	−0.557	0.45	−1.238	0.216
Survival	Temperate grassland	−0.702	0.487	−1.442	0.149
Survival	Tropical forest	−0.367	0.526	−0.697	0.486
Survival	Tropical grassland	−0.305	0.582	−0.524	0.601
Growth	Intercept	0.002	0.404	0.004	0.997
Growth	Trait effect	−0.068	0.033	−2.031	0.042
Growth	Desert	−0.006	0.474	−0.012	0.991
Growth	Temperate forest	0.081	0.425	0.191	0.849
Growth	Temperate grassland	0.168	0.461	0.364	0.716
Growth	Tropical forest	0.33	0.508	0.649	0.516
Growth	Tropical grassland	0.432	0.54	0.801	0.423
Fecundity	Intercept	−1.546	0.36	−4.291	0
Fecundity	Trait effect	−0.005	0.028	−0.175	0.861
Fecundity	Desert	0.733	0.432	1.697	0.09
Fecundity	Temperate forest	0.837	0.384	2.179	0.029
Fecundity	Temperate grassland	1.177	0.422	2.786	0.005
Fecundity	Tropical forest	0.812	0.443	1.831	0.067
Fecundity	Tropical grassland	1.293	0.501	2.581	0.01
Wood density					
Survival	Intercept	1.565	0.767	2.04	0.041
Survival	Trait effect	1.902	0.924	2.059	0.04
Survival	Temperate forest	−2.347	0.865	−2.714	0.007
Survival	Temperate grassland	−1.968	0.992	−1.983	0.047
Survival	Tropical forest	−1.224	0.952	−1.286	0.199
Survival	Tropical grassland	−2.006	1.094	−1.833	0.067
Growth	Intercept	1.546	0.856	1.806	0.071
Growth	Trait effect	−0.947	0.957	−0.989	0.323
Growth	Temperate forest	−1.803	0.794	−2.271	0.023
Growth	Temperate grassland	−0.939	0.905	−1.038	0.299
Growth	Tropical forest	−1.488	0.809	−1.839	0.066
Growth	Tropical grassland	−1.185	0.964	−1.228	0.219
Fecundity	Intercept	0.722	0.811	0.891	0.373
Fecundity	Trait effect	−0.392	0.902	−0.434	0.664
Fecundity	Temperate forest	−1.608	0.784	−2.053	0.04
Fecundity	Temperate grassland	−1.023	0.899	−1.138	0.255
Fecundity	Tropical forest	−1.404	0.806	−1.742	0.081
Fecundity	Tropical grassland	−1.372	0.965	−1.421	0.155
Leaf lifespan					
Survival	Intercept	−1.216	0.843	−1.443	0.149
Survival	Trait effect	1.129	0.335	3.375	0.001
Survival	Desert	4.642	1.041	4.459	0
Survival	Temperate forest	0.11	0.831	0.132	0.895
Survival	Temperate grassland	−1.48	1.274	−1.161	0.246
Survival	Tropical forest	0.044	0.94	0.047	0.963
Growth	Intercept	−0.773	0.745	−1.038	0.299
Growth	Trait effect	0.476	0.246	1.931	0.054
Growth	Desert	4.911	1.005	4.886	0
Growth	Temperate forest	−0.516	0.761	−0.678	0.498
Growth	Temperate grassland	0.748	1.013	0.739	0.46
Growth	Tropical forest	−0.712	0.957	−0.744	0.457
Fecundity	Intercept	−2.561	0.655	−3.91	0
Fecundity	Trait effect	0.143	0.24	0.597	0.55
Fecundity	Desert	6.75	0.928	7.272	0
Fecundity	Temperate forest	1.932	0.664	2.908	0.004
Fecundity	Temperate grassland	2.697	0.986	2.736	0.006
Fecundity	Tropical forest	1.829	0.813	2.25	0.024
SLA					
Survival	Intercept	1.402	0.626	2.239	0.025
Survival	Trait effect	−0.274	0.188	−1.453	0.146

Table S3. Cont.

Elasticity	Parameter	Coefficient	SE	Z	P
Survival	Desert	−1.197	0.571	−2.094	0.036
Survival	Temperate forest	−0.296	0.423	−0.701	0.483
Survival	Temperate grassland	−0.571	0.481	−1.187	0.235
Survival	Tropical forest	0.407	0.47	0.867	0.386
Survival	Tropical grassland	1.36	0.624	2.18	0.029
Growth	Intercept	−0.813	0.598	−1.359	0.174
Growth	Trait effect	0.324	0.157	2.069	0.039
Growth	Desert	0.275	0.599	0.459	0.646
Growth	Temperate forest	−0.347	0.4	−0.866	0.386
Growth	Temperate grassland	−0.369	0.46	−0.802	0.422
Growth	Tropical forest	−0.414	0.439	−0.941	0.347
Growth	Tropical grassland	1.893	0.656	2.887	0.004
Fecundity	Intercept	−2.663	0.551	−4.829	0
Fecundity	Trait effect	0.448	0.163	2.753	0.006
Fecundity	Desert	0.522	0.519	1.006	0.315
Fecundity	Temperate forest	0.687	0.36	1.906	0.057
Fecundity	Temperate grassland	0.732	0.423	1.732	0.083
Fecundity	Tropical forest	0.452	0.396	1.141	0.254
Fecundity	Tropical grassland	2.264	0.586	3.861	0
Leaf N					
Survival	Intercept	−1.376	1.045	−1.317	0.188
Survival	Trait effect	0.662	0.317	2.09	0.037
Survival	Desert	0.576	0.678	0.849	0.396
Survival	Temperate forest	−0.491	0.464	−1.058	0.29
Survival	Temperate grassland	−0.477	0.555	−0.858	0.391
Survival	Tropical forest	0.99	0.509	1.947	0.052
Survival	Tropical grassland	1.48	0.558	2.653	0.008
Growth	Intercept	−2.308	0.944	−2.444	0.015
Growth	Trait effect	0.776	0.293	2.652	0.008
Growth	Desert	1.199	0.668	1.794	0.073
Growth	Temperate forest	−0.451	0.432	−1.043	0.297
Growth	Temperate grassland	−0.012	0.536	−0.023	0.982
Growth	Tropical forest	−0.214	0.461	−0.465	0.642
Growth	Tropical grassland	1.408	0.534	2.638	0.008
Fecundity	Intercept	−4.677	0.905	−5.168	0
Fecundity	Trait effect	1.028	0.274	3.749	0
Fecundity	Desert	1.997	0.631	3.166	0.002
Fecundity	Temperate forest	0.689	0.385	1.787	0.074
Fecundity	Temperate grassland	0.917	0.485	1.891	0.059
Fecundity	Tropical forest	0.755	0.417	1.809	0.07
Fecundity	Tropical grassland	2.34	0.507	4.619	0

For each model, the overall intercept corresponds to the Arctic biome; the other biome coefficients are deviations from this baseline.

Table S4. PGLS regression results for models of vital rate elasticities including growth form as a covariate

Elasticity	Parameter	Coefficient	SE	t	P
Seed mass					
Survival	Intercept	0.789	2.336	0.338	0.7360
Survival	Trait effect	0.215	0.066	3.231	0.0015
Survival	Palm	1.159	2.540	0.456	0.6486
Survival	Shrub	0.641	0.538	1.193	0.2346
Survival	Succulent	1.361	1.907	0.714	0.4762
Survival	Tree	1.164	0.700	1.663	0.0980
Growth	Intercept	−1.616	2.061	−0.784	0.4339
Growth	Trait effect	−0.132	0.059	−2.243	0.0261
Growth	Palm	−1.431	2.241	−0.639	0.5239
Growth	Shrub	−0.566	0.475	−1.194	0.2341
Growth	Succulent	−1.183	1.683	−0.703	0.4829
Growth	Tree	−1.129	0.618	−1.828	0.0691
Fecundity	Intercept	−5.131	4.561	−1.125	0.2620
Fecundity	Trait effect	0.045	0.130	0.348	0.7279
Fecundity	Palm	0.655	4.958	0.132	0.8950
Fecundity	Shrub	2.327	1.050	2.216	0.0279
Fecundity	Succulent	0.085	3.723	0.023	0.9818
Fecundity	Tree	0.921	1.367	0.674	0.5011
Wood density					
Survival	Intercept	−1.751	2.365	−0.740	0.4617
Survival	Trait effect	4.099	1.844	2.223	0.0296
Survival	Palm	3.152	2.969	1.062	0.2922
Survival	Shrub	0.933	1.461	0.638	0.5255
Survival	Tree	2.650	1.205	2.200	0.0312
Growth	Intercept	0.048	2.316	0.021	0.9834
Growth	Trait effect	−4.179	1.805	−2.315	0.0237
Growth	Palm	−2.208	2.907	−0.759	0.4503
Growth	Shrub	−0.062	1.431	−0.044	0.9654
Growth	Tree	−1.384	1.179	−1.174	0.2447
Fecundity	Intercept	−0.732	2.686	−0.272	0.7861
Fecundity	Trait effect	−4.787	2.093	−2.287	0.0254
Fecundity	Palm	−2.300	3.371	−0.682	0.4975
Fecundity	Shrub	−2.849	1.659	−1.717	0.0906
Fecundity	Tree	−1.172	1.368	−0.857	0.3946
Lead lifespan					
Survival	Intercept	−1.795	1.652	−1.087	0.2884
Survival	Trait effect	1.279	0.363	3.520	0.0018
Survival	Shrub	0.710	0.965	0.736	0.4693
Survival	Tree	−0.375	0.683	−0.549	0.5884
Growth	Intercept	−0.942	3.267	−0.288	0.7757
Growth	Trait effect	−0.881	0.719	−1.226	0.2327
Growth	Shrub	0.035	1.909	0.018	0.9855
Growth	Tree	0.596	1.351	0.441	0.6632
Fecundity	Intercept	−5.103	4.036	−1.264	0.2187
Fecundity	Trait effect	−0.120	0.888	−0.136	0.8933
Fecundity	Shrub	2.242	2.358	0.951	0.3517
Fecundity	Tree	1.929	1.669	1.155	0.2599
SLA					
Survival	Intercept	2.019	2.853	0.708	0.4804
Survival	Trait effect	−0.352	0.342	−1.030	0.3049
Survival	Palm	1.452	2.988	0.486	0.6279
Survival	Shrub	−0.063	0.844	−0.075	0.9407
Survival	Tree	1.832	0.843	2.172	0.0316
Growth	Intercept	−3.064	2.776	−1.104	0.2717
Growth	Trait effect	0.228	0.333	0.684	0.4952
Growth	Palm	−1.128	2.907	−0.388	0.6987
Growth	Shrub	0.305	0.821	0.372	0.7106
Growth	Tree	−1.064	0.821	−1.296	0.1972
Fecundity	Intercept	−4.402	5.634	−0.781	0.4359
Fecundity	Trait effect	0.112	0.675	0.167	0.8680
Fecundity	Palm	3.251	5.900	0.551	0.5825
Fecundity	Shrub	0.835	1.666	0.501	0.6173

Table S4.   Cont.

Elasticity	Parameter	Coefficient	SE	t	P
Fecundity	Tree	−0.175	1.665	−0.105	0.9166
Leaf N					
Survival	Intercept	−0.521	2.298	−0.227	0.8212
Survival	Trait effect	0.583	0.366	1.592	0.1145
Survival	Palm	1.711	2.158	0.793	0.4297
Survival	Shrub	0.199	0.621	0.320	0.7496
Survival	Tree	2.174	0.608	3.578	0.0005
Growth	Intercept	−0.494	2.302	−0.215	0.8304
Growth	Trait effect	−0.733	0.367	−1.999	0.0483
Growth	Palm	−1.344	2.161	−0.622	0.5354
Growth	Shrub	0.278	0.622	0.448	0.6553
Growth	Tree	−1.498	0.609	−2.461	0.0156
Fecundity	Intercept	−10.741	5.943	−1.807	0.0737
Fecundity	Trait effect	2.152	0.947	2.274	0.0251
Fecundity	Palm	4.709	5.582	0.844	0.4008
Fecundity	Shrub	0.355	1.606	0.221	0.8256
Fecundity	Tree	0.488	1.572	0.310	0.7570

For each model, the overall intercept corresponds to the herbaceous perennial growth form; the other growth form coefficients are deviations from this baseline.

Table S5. PGLS regression results for models of vital rate elasticities including biome as a covariate

Elasticity	Parameter	Coefficient	SE	t	P
Seed mass					
Survival	Intercept	2.586	2.307	1.121	0.2637
Survival	Trait effect	0.251	0.064	3.940	0.0001
Survival	Desert	−1.825	0.649	−2.812	0.0055
Survival	Temperate forest	−1.121	0.514	−2.180	0.0305
Survival	Temperate grassland	−1.435	0.624	−2.299	0.0226
Survival	Tropical forest	−0.425	0.796	−0.534	0.5940
Survival	Tropical grassland	−1.185	0.672	−1.763	0.0795
Growth	Intercept	−3.052	2.051	−1.488	0.1385
Growth	Trait effect	−0.160	0.057	−2.823	0.0053
Growth	Desert	1.260	0.577	2.182	0.0303
Growth	Temperate forest	0.825	0.457	1.805	0.0727
Growth	Temperate grassland	0.736	0.555	1.327	0.1863
Growth	Tropical forest	0.009	0.707	0.013	0.9896
Growth	Tropical grassland	0.593	0.598	0.993	0.3221
Fecundity	Intercept	−5.342	4.558	−1.172	0.2427
Fecundity	Trait effect	0.080	0.126	0.633	0.5277
Fecundity	Desert	1.442	1.282	1.125	0.2622
Fecundity	Temperate forest	0.905	1.016	0.891	0.3742
Fecundity	Temperate grassland	2.225	1.233	1.805	0.0728
Fecundity	Tropical forest	0.504	1.572	0.321	0.7489
Fecundity	Tropical grassland	2.807	1.328	2.113	0.0359
Wood density					
Survival	Intercept	0.412	2.433	0.169	0.8660
Survival	Trait effect	5.033	1.619	3.108	0.0028
Survival	Desert	−2.750	2.254	−1.220	0.2268
Survival	Temperate forest	−1.233	1.278	−0.965	0.3382
Survival	Temperate grassland	−1.155	1.410	−0.819	0.4156
Survival	Tropical forest	0.940	1.455	0.646	0.5204
Survival	Tropical grassland	−0.956	1.529	−0.626	0.5338
Growth	Intercept	−0.658	2.365	−0.278	0.7816
Growth	Trait effect	−4.326	1.574	−2.748	0.0077
Growth	Desert	2.105	2.191	0.961	0.3402
Growth	Temperate forest	0.340	1.242	0.274	0.7852
Growth	Temperate grassland	0.063	1.370	0.046	0.9633
Growth	Tropical forest	−1.468	1.415	−1.038	0.3033
Growth	Tropical grassland	0.375	1.486	0.252	0.8018
Fecundity	Intercept	−0.859	2.902	−0.296	0.7682
Fecundity	Trait effect	−4.601	1.932	−2.381	0.0202
Fecundity	Desert	1.490	2.689	0.554	0.5815
Fecundity	Temperate forest	−0.693	1.525	−0.455	0.6509
Fecundity	Temperate grassland	0.164	1.682	0.097	0.9229
Fecundity	Tropical forest	−1.836	1.736	−1.057	0.2943
Fecundity	Tropical grassland	−0.874	1.824	−0.479	0.6333
Leaf lifespan					
Survival	Intercept	−0.684	1.782	−0.384	0.7047
Survival	Trait effect	1.027	0.400	2.564	0.0181
Survival	Desert	−1.137	1.228	−0.926	0.3650
Survival	Temperate forest	−0.453	0.914	−0.496	0.6250
Survival	Temperate grassland	−2.244	1.302	−1.723	0.0995
Survival	Tropical forest	0.319	1.101	0.290	0.7748
Growth	Intercept	−0.976	3.730	−0.262	0.7961
Growth	Trait effect	−0.499	0.838	−0.595	0.5583
Growth	Desert	0.542	2.570	0.211	0.8349
Growth	Temperate forest	−1.010	1.913	−0.528	0.6031
Growth	Temperate grassland	1.057	2.726	0.388	0.7020
Growth	Tropical forest	−1.461	2.305	−0.634	0.5329
Fecundity	Intercept	−9.827	3.410	−2.882	0.0089
Fecundity	Trait effect	−0.658	0.766	−0.859	0.4002
Fecundity	Desert	8.535	2.350	3.632	0.0016
Fecundity	Temperate forest	8.171	1.749	4.671	0.0001
Fecundity	Temperate grassland	9.116	2.492	3.658	0.0015
Fecundity	Tropical forest	7.514	2.108	3.565	0.0018

Table S5. Cont.

Elasticity	Parameter	Coefficient	SE	t	P
SLA					
Survival	Intercept	4.846	2.606	1.859	0.0653
Survival	Trait effect	−0.805	0.331	−2.434	0.0163
Survival	Desert	−3.423	0.825	−4.149	0.0001
Survival	Temperate forest	−0.643	0.568	−1.132	0.2598
Survival	Temperate grassland	−0.422	0.672	−0.628	0.5313
Survival	Tropical forest	0.930	0.841	1.106	0.2707
Survival	Tropical grassland	−0.750	0.962	−0.780	0.4370
Growth	Intercept	−4.725	2.610	−1.810	0.0726
Growth	Trait effect	0.509	0.331	1.535	0.1272
Growth	Desert	2.527	0.826	3.058	0.0027
Growth	Temperate forest	0.424	0.569	0.745	0.4577
Growth	Temperate grassland	0.077	0.673	0.115	0.9085
Growth	Tropical forest	−0.741	0.842	−0.880	0.3803
Growth	Tropical grassland	0.319	0.963	0.331	0.7411
Fecundity	Intercept	−5.814	5.302	−1.097	0.2749
Fecundity	Trait effect	0.062	0.673	0.093	0.9264
Fecundity	Desert	−0.445	1.678	−0.265	0.7914
Fecundity	Temperate forest	1.398	1.156	1.209	0.2287
Fecundity	Temperate grassland	1.842	1.366	1.348	0.1799
Fecundity	Tropical forest	−1.207	1.710	−0.706	0.4816
Fecundity	Tropical grassland	5.141	1.956	2.628	0.0096
Leaf N					
Survival	Intercept	1.192	2.322	0.513	0.6089
Survival	Trait effect	0.612	0.379	1.615	0.1095
Survival	Desert	−1.145	1.009	−1.134	0.2594
Survival	Temperate forest	−0.556	0.680	−0.818	0.4155
Survival	Temperate grassland	−0.623	0.737	−0.845	0.4001
Survival	Tropical forest	1.420	0.780	1.821	0.0717
Survival	Tropical grassland	0.295	0.836	0.352	0.7254
Growth	Intercept	−1.052	2.287	−0.460	0.6467
Growth	Trait effect	−0.818	0.373	−2.190	0.0309
Growth	Desert	1.083	0.994	1.090	0.2784
Growth	Temperate forest	−0.010	0.670	−0.016	0.9876
Growth	Temperate grassland	0.135	0.726	0.186	0.8525
Growth	Tropical forest	−1.580	0.768	−2.057	0.0423
Growth	Tropical grassland	−1.031	0.824	−1.251	0.2138
Fecundity	Intercept	−14.587	5.510	−2.647	0.0094
Fecundity	Trait effect	2.645	0.900	2.940	0.0041
Fecundity	Desert	2.366	2.395	0.988	0.3256
Fecundity	Temperate forest	2.731	1.614	1.692	0.0938
Fecundity	Temperate grassland	2.507	1.748	1.434	0.1547
Fecundity	Tropical forest	1.520	1.851	0.821	0.4135
Fecundity	Tropical grassland	7.441	1.985	3.749	0.0003

For each model, the overall intercept corresponds to the Arctic biome; the other biome coefficients are deviations from this baseline.

Table S6. PGLS regression results for models of vital rates including growth form as a covariate

Vital rate	Parameter	Coefficient	SE	t	P
Seed mass					
Survival	Intercept	3.183	3.750	0.849	0.3971
Survival	Trait effect	0.222	0.107	2.078	0.0390
Survival	Palm	−0.614	4.076	−0.151	0.8805
Survival	Shrub	−3.631	0.863	−4.206	0.0000
Survival	Succulent	−1.162	3.061	−0.379	0.7048
Survival	Tree	−1.864	1.124	−1.658	0.0989
Growth	Intercept	−0.584	1.731	−0.337	0.7363
Growth	Trait effect	−0.103	0.049	−2.094	0.0376
Growth	Palm	−1.114	1.882	−0.592	0.5546
Growth	Shrub	−1.013	0.399	−2.542	0.0118
Growth	Succulent	−1.266	1.413	−0.896	0.3716
Growth	Tree	−1.308	0.519	−2.521	0.0125
Fecundity	Intercept	−1.643	6.118	−0.269	0.7885
Fecundity	Trait effect	−0.261	0.174	−1.498	0.1359
Fecundity	Palm	6.293	6.651	0.946	0.3453
Fecundity	Shrub	3.060	1.409	2.172	0.0311
Fecundity	Succulent	7.968	4.995	1.595	0.1124
Fecundity	Tree	2.493	1.834	1.360	0.1755
Wood density					
Survival	Intercept	−0.723	1.906	−0.379	0.7057
Survival	Trait effect	5.904	1.486	3.974	0.0002
Survival	Palm	1.196	2.393	0.500	0.6189
Survival	Shrub	0.165	1.178	0.141	0.8887
Survival	Tree	0.412	0.971	0.425	0.6723
Growth	Intercept	0.470	2.040	0.230	0.8185
Growth	Trait effect	−0.192	1.590	−0.121	0.9044
Growth	Palm	−2.837	2.561	−1.108	0.2719
Growth	Shrub	−0.526	1.261	−0.417	0.6781
Growth	Tree	−2.730	1.039	−2.628	0.0106
Fecundity	Intercept	6.700	5.555	1.206	0.2321
Fecundity	Trait effect	−19.305	4.331	−4.458	0.0000
Fecundity	Palm	−1.770	6.974	−0.254	0.8004
Fecundity	Shrub	2.901	3.433	0.845	0.4011
Fecundity	Tree	3.220	2.829	1.138	0.2591
Leaf lifespan					
Survival	Intercept	−1.189	1.585	−0.750	0.4606
Survival	Trait effect	1.122	0.349	3.217	0.0038
Survival	Shrub	0.024	0.926	0.026	0.9797
Survival	Tree	0.411	0.656	0.626	0.5372
Growth	Intercept	0.515	1.567	0.328	0.7455
Growth	Trait effect	−0.670	0.345	−1.944	0.0642
Growth	Shrub	−0.516	0.916	−0.563	0.5787
Growth	Tree	−0.702	0.648	−1.083	0.2902
Fecundity	Intercept	4.686	5.629	0.832	0.4137
Fecundity	Trait effect	−2.532	1.239	−2.044	0.0525
Fecundity	Shrub	−2.229	3.290	−0.678	0.5048
Fecundity	Tree	5.145	2.329	2.209	0.0374
SLA					
Survival	Intercept	3.257	3.967	0.821	0.4131
Survival	Trait effect	−0.879	0.475	−1.848	0.0669
Survival	Palm	1.227	4.154	0.295	0.7682
Survival	Shrub	−0.049	1.173	−0.042	0.9666
Survival	Tree	1.202	1.173	1.025	0.3071
Growth	Intercept	−1.043	2.055	−0.508	0.6125
Growth	Trait effect	0.217	0.246	0.883	0.3788
Growth	Palm	−1.517	2.152	−0.705	0.4819
Growth	Shrub	−0.557	0.608	−0.917	0.3608
Growth	Tree	−1.530	0.607	−2.519	0.0130
Fecundity	Intercept	−3.693	7.535	−0.490	0.6248
Fecundity	Trait effect	1.113	0.903	1.233	0.2199
Fecundity	Palm	3.491	7.891	0.442	0.6589
Fecundity	Shrub	3.061	2.229	1.373	0.1720

Table S6. Cont.

Vital rate	Parameter	Coefficient	SE	t	P
Fecundity	Tree	1.810	2.227	0.813	0.4178
Leaf N					
Survival	Intercept	0.175	1.714	0.102	0.9191
Survival	Trait effect	0.142	0.273	0.520	0.6040
Survival	Palm	1.080	1.610	0.671	0.5037
Survival	Shrub	0.493	0.463	1.065	0.2893
Survival	Tree	1.853	0.453	4.088	0.0001
Growth	Intercept	0.475	2.129	0.223	0.8238
Growth	Trait effect	−0.167	0.339	−0.492	0.6240
Growth	Palm	−1.398	2.000	−0.699	0.4860
Growth	Shrub	−0.281	0.575	−0.489	0.6261
Growth	Tree	−1.917	0.563	−3.404	0.0010
Fecundity	Intercept	−0.054	6.802	−0.008	0.9937
Fecundity	Trait effect	0.105	1.083	0.097	0.9229
Fecundity	Palm	4.506	6.388	0.705	0.4822
Fecundity	Shrub	0.663	1.838	0.361	0.7190
Fecundity	Tree	0.237	1.799	0.132	0.8956

For each model, the overall intercept corresponds to the herbaceous perennial growth form; the other growth form coefficients are deviations from this baseline.

Table S7. PGLS regression results for models of vital rates including biome as a covariate

Vital rate	Parameter	Coefficient	SE	t	P
Seed mass					
Survival	Intercept	2.424	3.929	0.617	0.5379
Survival	Trait effect	0.163	0.108	1.506	0.1338
Survival	Desert	−0.600	1.105	−0.543	0.5878
Survival	Temperate forest	−0.885	0.875	−1.011	0.3134
Survival	Temperate grassland	−1.018	1.063	−0.958	0.3393
Survival	Tropical forest	−0.084	1.355	−0.062	0.9505
Survival	Tropical grassland	−1.138	1.145	−0.994	0.3216
Growth	Intercept	−1.930	1.759	−1.097	0.2739
Growth	Trait effect	−0.139	0.049	−2.874	0.0045
Growth	Desert	0.587	0.495	1.186	0.2370
Growth	Temperate forest	0.601	0.392	1.533	0.1270
Growth	Temperate grassland	0.161	0.476	0.339	0.7351
Growth	Tropical forest	0.018	0.607	0.030	0.9760
Growth	Tropical grassland	0.430	0.512	0.839	0.4025
Fecundity	Intercept	−0.810	6.212	−0.130	0.8964
Fecundity	Trait effect	−0.137	0.171	−0.801	0.4241
Fecundity	Desert	2.690	1.748	1.539	0.1255
Fecundity	Temperate forest	0.906	1.384	0.654	0.5137
Fecundity	Temperate grassland	2.109	1.681	1.255	0.2110
Fecundity	Tropical forest	0.260	2.143	0.122	0.9034
Fecundity	Tropical grassland	1.588	1.810	0.877	0.3813
Wood density					
Survival	Intercept	1.031	1.848	0.558	0.5788
Survival	Trait effect	5.185	1.230	4.215	0.0001
Survival	Desert	−0.024	1.712	−0.014	0.9890
Survival	Temperate forest	−1.518	0.971	−1.564	0.1227
Survival	Temperate grassland	−1.882	1.071	−1.758	0.0835
Survival	Tropical forest	−0.398	1.106	−0.360	0.7197
Survival	Tropical grassland	−2.664	1.161	−2.294	0.0250
Growth	Intercept	−2.310	2.097	−1.102	0.2746
Growth	Trait effect	−1.563	1.396	−1.120	0.2668
Growth	Desert	2.287	1.942	1.177	0.2434
Growth	Temperate forest	2.028	1.102	1.841	0.0702
Growth	Temperate grassland	−0.296	1.215	−0.243	0.8085
Growth	Tropical forest	0.184	1.254	0.147	0.8838
Growth	Tropical grassland	0.961	1.318	0.730	0.4682
Fecundity	Intercept	6.747	6.060	1.113	0.2697
Fecundity	Trait effect	−16.752	4.034	−4.153	0.0001
Fecundity	Desert	4.658	5.614	0.830	0.4097
Fecundity	Temperate forest	1.763	3.184	0.554	0.5818
Fecundity	Temperate grassland	1.923	3.512	0.547	0.5860
Fecundity	Tropical forest	1.212	3.626	0.334	0.7392
Fecundity	Tropical grassland	4.016	3.808	1.054	0.2956
Leaf lifespan					
Survival	Intercept	−1.778	1.725	−1.031	0.3143
Survival	Trait effect	1.142	0.388	2.945	0.0077
Survival	Desert	2.304	1.188	1.939	0.0661
Survival	Temperate forest	0.885	0.885	1.000	0.3286
Survival	Temperate grassland	0.104	1.260	0.082	0.9352
Survival	Tropical forest	0.937	1.066	0.879	0.3894
Growth	Intercept	1.025	1.633	0.628	0.5368
Growth	Trait effect	−0.470	0.367	−1.280	0.2145
Growth	Desert	−1.510	1.125	−1.342	0.1939
Growth	Temperate forest	−1.786	0.838	−2.132	0.0450
Growth	Temperate grassland	−0.648	1.193	−0.543	0.5926
Growth	Tropical forest	−2.297	1.009	−2.277	0.0334
Fecundity	Intercept	2.818	6.295	0.448	0.6590
Fecundity	Trait effect	−3.470	1.415	−2.453	0.0230
Fecundity	Desert	7.624	4.337	1.758	0.0933
Fecundity	Temperate forest	7.658	3.229	2.372	0.0274
Fecundity	Temperate grassland	8.330	4.600	1.811	0.0845
Fecundity	Tropical forest	12.179	3.890	3.130	0.0051

Table S7.　Cont.

Vital rate	Parameter	Coefficient	SE	t	P
SLA					
Survival	Intercept	3.580	3.833	0.934	0.3520
Survival	Trait effect	−0.643	0.487	−1.322	0.1884
Survival	Desert	1.996	1.213	1.645	0.1024
Survival	Temperate forest	−0.081	0.836	−0.097	0.9229
Survival	Temperate grassland	−0.916	0.988	−0.927	0.3554
Survival	Tropical forest	1.041	1.236	0.842	0.4014
Survival	Tropical grassland	−0.004	1.414	−0.003	0.9976
Growth	Intercept	−2.810	1.992	−1.411	0.1608
Growth	Trait effect	0.475	0.253	1.878	0.0627
Growth	Desert	1.246	0.631	1.976	0.0503
Growth	Temperate forest	0.183	0.434	0.421	0.6748
Growth	Temperate grassland	−0.158	0.513	−0.309	0.7582
Growth	Tropical forest	−0.949	0.643	−1.476	0.1423
Growth	Tropical grassland	0.092	0.735	0.126	0.9001
Fecundity	Intercept	−4.009	7.365	−0.544	0.5872
Fecundity	Trait effect	1.402	0.935	1.499	0.1363
Fecundity	Desert	3.107	2.331	1.333	0.1851
Fecundity	Temperate forest	0.773	1.606	0.481	0.6313
Fecundity	Temperate grassland	1.661	1.898	0.875	0.3830
Fecundity	Tropical forest	0.453	2.376	0.191	0.8491
Fecundity	Tropical grassland	4.776	2.718	1.758	0.0812
Leaf N					
Survival	Intercept	1.519	1.787	0.850	0.3973
Survival	Trait effect	0.118	0.292	0.404	0.6872
Survival	Desert	−0.098	0.777	−0.126	0.8997
Survival	Temperate forest	−0.102	0.524	−0.195	0.8462
Survival	Temperate grassland	−0.527	0.567	−0.930	0.3547
Survival	Tropical forest	1.072	0.600	1.787	0.0771
Survival	Tropical grassland	0.573	0.644	0.889	0.3759
Growth	Intercept	−0.677	2.151	−0.315	0.7537
Growth	Trait effect	−0.155	0.351	−0.442	0.6597
Growth	Desert	−0.127	0.935	−0.135	0.8926
Growth	Temperate forest	0.058	0.630	0.092	0.9269
Growth	Temperate grassland	−0.901	0.682	−1.319	0.1901
Growth	Tropical forest	−1.432	0.723	−1.981	0.0503
Growth	Tropical grassland	−0.838	0.775	−1.082	0.2819
Fecundity	Intercept	−4.417	6.604	−0.669	0.5052
Fecundity	Trait effect	0.395	1.078	0.366	0.7150
Fecundity	Desert	1.607	2.871	0.560	0.5768
Fecundity	Temperate forest	4.059	1.935	2.098	0.0384
Fecundity	Temperate grassland	3.334	2.095	1.591	0.1147
Fecundity	Tropical forest	3.060	2.218	1.380	0.1708
Fecundity	Tropical grassland	6.643	2.379	2.793	0.0063

For each model, the overall intercept corresponds to the Arctic biome; the other biome coefficients are deviations from this baseline.