
(a) Birds

<i>Acrocephalus dumetorum</i>	0.23	0.79	0.75	0.96	0.32	0.35	1.03	0.74	0.54	0.68	0.83
<i>Acrocephalus palustris</i>	0.22	0.83	0.77	0.92	0.42	0.27	0.90	0.82	0.49	0.72	0.81
<i>Aegolius funereus</i>	0.65	0.80	0.73	0.91	0.53	0.33	0.87	0.89	0.76	0.62	0.57
<i>Anas acuta</i>	0.33	0.71	0.59	0.83	0.28	0.11	0.87	0.63	0.53	0.66	0.60
<i>Asio otus</i>	0.34	0.85	0.84	1.00	0.51	0.38	0.91	0.81	0.61	0.73	0.85
<i>Aythya ferina</i>	0.26	0.84	0.81	0.96	0.48	0.34	0.91	0.77	0.60	0.77	0.84
<i>Bonasa bonasia</i>	0.70	0.85	0.79	0.93	0.63	0.48	0.91	0.91	0.80	0.70	0.69
<i>Caprimulgus europaeus</i>	0.19	0.89	0.86	0.97	0.48	0.39	0.94	0.80	0.43	0.79	0.95
<i>Columba oenas</i>	0.23	0.87	0.86	1.00	0.52	0.32	0.87	0.76	0.50	0.83	0.92
<i>Crex crex</i>	0.13	0.83	0.79	0.95	0.31	0.25	0.96	0.79	0.57	0.71	0.76
<i>Emberiza schoeniclus</i>	0.84	0.73	0.56	0.77	0.32	0.06	0.80	0.84	0.79	0.52	0.28
<i>Ficedula parva</i>	0.09	0.77	0.71	0.92	0.19	0.11	0.94	0.66	0.55	0.70	0.73
<i>Gavia stellata</i>	0.12	0.71	0.50	0.71	0.18	0.00	0.85	0.53	0.55	0.72	0.45
<i>Glaucidium passerinum</i>	0.19	0.74	0.70	0.95	0.21	0.09	0.91	0.78	0.53	0.60	0.75
<i>Lanius collurio</i>	0.58	0.86	0.87	1.01	0.59	0.47	0.92	0.89	0.55	0.69	0.90
<i>Limicola falcinellus</i>	0.04	0.91	0.81	0.89	0.24	0.25	1.01	0.74	0.51	0.81	0.86
<i>Lullula arborea</i>	0.03	0.85	0.80	0.93	0.29	0.08	0.85	0.68	0.34	0.86	0.86
<i>Lymnocyptes minimus</i>	0.09	0.81	0.81	1.00	0.23	0.27	1.03	0.66	0.65	0.74	0.77
<i>Melanitta nigra</i>	0.05	0.83	0.75	0.91	0.21	0.13	0.93	0.60	0.59	0.86	0.70
<i>Mergus albellus</i>	0.06	0.86	0.77	0.89	0.27	0.20	0.94	0.77	0.86	0.85	0.54
<i>Numenius phaeopus</i>	0.30	0.92	0.87	0.94	0.66	0.60	0.97	0.89	0.88	0.83	0.74
<i>Parus ater</i>	0.35	0.88	0.75	0.86	0.60	0.12	0.70	0.80	0.18	0.82	0.95
<i>Parus cinctus</i>	0.10	0.94	0.90	0.96	0.59	0.63	1.05	0.90	0.80	0.84	0.89
<i>Phylloscopus borealis</i>	0.02	0.77	0.57	0.75	0.11	0.04	0.94	0.53	0.46	0.84	0.61

<i>Phylloscopus sibilatrix</i>	0.64	0.84	0.76	0.90	0.59	0.52	0.96	0.90	0.71	0.67	0.85
<i>Strix aluco</i>	0.25	0.88	0.84	0.96	0.56	0.32	0.85	0.84	0.69	0.79	0.81
<i>Sturnus vulgaris</i>	0.66	0.89	0.84	0.94	0.63	0.51	0.93	0.89	0.73	0.74	0.78
<i>Tetrao tetrix</i>	0.82	0.83	0.71	0.86	0.54	0.30	0.85	0.90	0.74	0.66	0.60
<i>Tringa ochropus</i>	0.66	0.79	0.65	0.82	0.50	0.31	0.87	0.85	0.64	0.64	0.68
<i>Troglodytes troglodytes</i>	0.34	0.78	0.74	0.95	0.41	0.32	0.94	0.79	0.55	0.67	0.78
(b) Butterflies											
<i>Albulina optilete</i>	0.43	0.53	0.51	0.97	0.04	0.02	0.99	0.49	0.63	0.55	0.39
<i>Anthocharis cardamines</i>	0.49	0.68	0.67	0.97	0.25	0.22	0.97	0.64	0.88	0.61	0.34
<i>Aphantopus hyperantus</i>	0.57	0.80	0.82	1.02	0.48	0.38	0.93	0.85	0.58	0.62	0.80
<i>Aporia crataegi</i>	0.29	0.75	0.75	1.01	0.34	0.39	1.03	0.61	0.71	0.75	0.67
<i>Araschnia levana</i>	0.03	0.90	0.48	0.54	0.27	-0.02	0.78	0.82	0.12	0.85	0.86
<i>Argynnis adippe</i>	0.36	0.81	0.79	0.97	0.47	0.37	0.93	0.80	0.58	0.71	0.79
<i>Argynnis paphia</i>	0.07	0.77	0.59	0.77	0.19	0.04	0.88	0.57	0.32	0.81	0.77
<i>Aricia artaxerxes</i>	0.22	0.75	0.61	0.82	0.30	0.11	0.85	0.67	0.68	0.71	0.49
<i>Aricia eumedon</i>	0.20	0.69	0.60	0.86	0.22	0.07	0.88	0.64	0.80	0.69	0.30
<i>Boloria euphrosyne</i>	0.54	0.62	0.53	0.85	0.18	0.05	0.89	0.63	0.60	0.55	0.45
<i>Brenthis ino</i>	0.51	0.68	0.71	1.04	0.27	0.22	0.96	0.71	0.51	0.56	0.71
<i>Coenonympha tullia</i>	0.20	0.68	0.56	0.83	0.17	0.07	0.92	0.58	0.51	0.64	0.59
<i>Colias palaeno</i>	0.43	0.63	0.53	0.84	0.18	0.04	0.88	0.63	0.71	0.56	0.33
<i>Erebia ligea</i>	0.50	0.74	0.62	0.84	0.35	0.14	0.85	0.80	0.47	0.55	0.67
<i>Gonepteryx rhamni</i>	0.59	0.80	0.81	1.01	0.47	0.43	0.97	0.78	0.64	0.70	0.79
<i>Lasiommata maera</i>	0.45	0.81	0.79	0.98	0.47	0.39	0.94	0.83	0.58	0.65	0.80
<i>Limenitis populi</i>	0.10	0.88	0.71	0.81	0.40	0.27	0.91	0.73	0.63	0.85	0.66
<i>Lycaena virgaureae</i>	0.55	0.73	0.71	0.98	0.36	0.20	0.89	0.76	0.43	0.60	0.77
<i>Melitaea athalia</i>	0.36	0.74	0.73	0.99	0.34	0.29	0.96	0.73	0.67	0.63	0.66

<i>Nymphalis antiopa</i>	0.57	0.71	0.66	0.93	0.32	0.23	0.93	0.82	0.68	0.48	0.55
<i>Papilio machaon</i>	0.37	0.69	0.62	0.90	0.26	0.16	0.93	0.74	0.74	0.54	0.44
<i>Pararge aegeria</i>	0.25	0.78	0.73	0.93	0.33	0.16	0.88	0.69	0.60	0.72	0.67
<i>Pieris napi</i>	0.75	0.71	0.65	0.92	0.29	0.17	0.91	0.75	0.70	0.55	0.47
<i>Pieris rapae</i>	0.30	0.72	0.68	0.94	0.28	0.23	0.96	0.69	0.60	0.64	0.67
<i>Plebeius argus</i>	0.43	0.68	0.68	1.00	0.23	0.23	1.00	0.69	0.53	0.56	0.70
<i>Polyommatus semiargus</i>	0.43	0.70	0.70	1.00	0.26	0.24	0.99	0.69	0.64	0.58	0.63
<i>Pyrgus malvae</i>	0.30	0.72	0.79	1.10	0.25	0.19	0.95	0.71	0.26	0.61	0.92
<i>Thecla betulae</i>	0.07	0.79	0.79	1.00	0.14	0.16	1.02	0.69	0.61	0.74	0.80
<i>Thymelicus lineola</i>	0.50	0.75	0.76	1.01	0.36	0.32	0.97	0.76	0.57	0.59	0.75
<i>Vanessa cardui</i>	0.46	0.71	0.69	0.97	0.28	0.24	0.97	0.66	0.56	0.62	0.69

(c) Vascular plants

<i>Actaea erythrocarpa</i>	0.04	0.90	0.69	0.77	0.35	0.09	0.81	0.65	0.63	0.93	0.59
<i>Actaea spicata</i>	0.31	0.86	0.76	0.88	0.55	0.30	0.84	0.82	0.61	0.79	0.75
<i>Astragalus frigidus</i>	0.02	0.93	0.79	0.85	0.41	0.14	0.81	0.72	0.42	0.95	0.83
<i>Campanula persicifolia</i>	0.36	0.92	0.76	0.82	0.71	0.10	0.64	0.85	0.24	0.87	0.87
<i>Carex capitata</i>	0.07	0.89	0.70	0.79	0.32	0.13	0.86	0.78	0.65	0.84	0.63
<i>Carex rhyncophysa</i>	0.11	0.80	0.70	0.87	0.26	0.07	0.85	0.69	0.68	0.74	0.55
<i>Circaea alpina</i>	0.20	0.83	0.73	0.87	0.39	0.16	0.84	0.81	0.42	0.73	0.81
<i>Crepis paladosa</i>	0.27	0.79	0.63	0.79	0.40	0.19	0.85	0.62	0.61	0.78	0.58
<i>Daphne mezereum</i>	0.34	0.76	0.63	0.83	0.37	0.13	0.83	0.64	0.59	0.74	0.57
<i>Elymus caninus</i>	0.38	0.74	0.55	0.75	0.32	0.05	0.81	0.68	0.48	0.64	0.59
<i>Galium odoratum</i>	0.04	0.86	0.72	0.85	0.18	0.03	0.87	0.69	0.30	0.80	0.87
<i>Galium trifidum</i>	0.17	0.79	0.62	0.79	0.29	0.11	0.86	0.66	0.53	0.76	0.65
<i>Glyceria lithuanica</i>	0.08	0.87	0.78	0.90	0.32	0.16	0.88	0.70	0.75	0.82	0.69
<i>Lactuca sibirica</i>	0.07	0.78	0.58	0.74	0.23	0.14	0.92	0.52	0.53	0.86	0.57

<i>Listera ovata</i>	0.17	0.77	0.60	0.79	0.29	0.09	0.84	0.57	0.49	0.79	0.62
<i>Lonicera xylosteum</i>	0.33	0.90	0.75	0.83	0.64	0.20	0.73	0.86	0.33	0.82	0.88
<i>Luzula parviflora</i>	0.03	0.97	0.91	0.94	0.49	0.23	0.83	0.84	0.59	0.95	0.93
<i>Milium effusum</i>	0.51	0.73	0.55	0.75	0.38	0.06	0.77	0.62	0.19	0.77	0.86
<i>Moehringia trinervia</i>	0.36	0.88	0.87	0.99	0.61	0.35	0.83	0.83	0.38	0.80	0.93
<i>Mycelis muralis</i>	0.12	0.94	0.81	0.87	0.50	0.12	0.75	0.85	0.43	0.85	0.84
<i>Neottia nidus-avis</i>	0.04	0.86	0.75	0.87	0.25	0.04	0.83	0.62	0.16	0.89	0.96
<i>Platanthera bifolia</i>	0.39	0.80	0.71	0.89	0.45	0.19	0.82	0.72	0.47	0.75	0.74
<i>Poa remota</i>	0.12	0.86	0.71	0.82	0.37	0.07	0.78	0.74	0.31	0.80	0.85
<i>Stachys silvatica</i>	0.19	0.89	0.75	0.85	0.46	0.11	0.76	0.84	0.31	0.79	0.84
<i>Stellaria nemorum</i>	0.25	0.74	0.63	0.85	0.32	0.11	0.85	0.62	0.33	0.73	0.83
<i>Tilia cordata</i>	0.30	0.92	0.85	0.93	0.69	0.38	0.81	0.88	0.64	0.84	0.81
<i>Trollius europaeus</i>	0.31	0.80	0.53	0.66	0.44	0.03	0.72	0.69	0.74	0.78	0.30
<i>Vicia sylvatica</i>	0.30	0.90	0.76	0.84	0.60	0.18	0.74	0.86	0.57	0.80	0.76
<i>Viola mirabilis</i>	0.22	0.90	0.71	0.78	0.54	0.12	0.73	0.88	0.38	0.80	0.77
<i>Viola selkirkii</i>	0.09	0.87	0.68	0.77	0.34	0.17	0.87	0.70	0.47	0.85	0.75

Table A1. The performance of the 10 model types as regards accuracy (mean \pm standard deviation of AUC/Kappa) in interpolative and extrapolative validation and their transferability, measured across the 90 study species. Transferability is calculated as the AUC/Kappa ratio in extrapolative vs. interpolative model validation for each species separately, and then averaged across the 90 study species for each model type separately.

	<u>AUC</u>			<u>Kappa</u>		
	Interpolative validation	Extrapolative validation	Transferability	Interpolative validation	Extrapolative validation	Transferability
ANN	0.772 \pm 0.100	0.709 \pm 0.120	0.922 \pm 0.125	0.330 \pm 0.116	0.206 \pm 0.165	0.911 \pm 0.093
CTA	0.765 \pm 0.100	0.680 \pm 0.108	0.891 \pm 0.105	0.372 \pm 0.162	0.211 \pm 0.164	0.887 \pm 0.100
GAM	0.822 \pm 0.091	0.746 \pm 0.113	0.908 \pm 0.103	0.381 \pm 0.161	0.238 \pm 0.152	0.900 \pm 0.092
GARP	0.777 \pm 0.087	0.699 \pm 0.104	0.901 \pm 0.101	0.337 \pm 0.147	0.164 \pm 0.131	0.876 \pm 0.095
GBM	0.824 \pm 0.085	0.742 \pm 0.109	0.901 \pm 0.102	0.399 \pm 0.152	0.223 \pm 0.152	0.878 \pm 0.088
GLM	0.819 \pm 0.088	0.742 \pm 0.113	0.907 \pm 0.105	0.383 \pm 0.156	0.226 \pm 0.150	0.891 \pm 0.094
MARS	0.810 \pm 0.081	0.649 \pm 0.155	0.805 \pm 0.188	0.358 \pm 0.171	0.152 \pm 0.177	0.858 \pm 0.153
MAXENT	0.815 \pm 0.089	0.749 \pm 0.111	0.919 \pm 0.098	0.399 \pm 0.154	0.232 \pm 0.147	0.885 \pm 0.096
MDA	0.794 \pm 0.086	0.704 \pm 0.111	0.887 \pm 0.109	0.359 \pm 0.153	0.211 \pm 0.163	0.894 \pm 0.090
RF	0.829 \pm 0.081	0.712 \pm 0.135	0.859 \pm 0.136	0.417 \pm 0.155	0.226 \pm 0.180	0.870 \pm 0.122

Table A2. Pair-wise comparison of the transferability of the 10 model types, based on models developed for all 90 study species, and the Kappa values from interpolative vs. extrapolative validation. The lower half of the matrix contains test statistics from paired t-tests, and the upper half shows their corresponding statistical significance (p-values). P-values significant at the Bonferroni-corrected p-value level (0.0011 for the 45 model-by-model comparisons) are shown in bold.

	ANN	CTA	GAM	GARP	GBM	GLM	MARS	MAXENT	MDA	RF
ANN		0.0051	0.1969	0.0014	0.0002	0.0263	0.0006	0.0085	0.0530	0.0005
CTA	2.869		0.0443	0.2443	0.2245	0.5392	0.0511	0.8614	0.3482	0.0941
GAM	1.300	-2.040		0.0122	0.0008	0.0369	0.0021	0.0546	0.3498	0.0026
GARP	3.297	1.172	2.560		0.8545	0.1208	0.2648	0.3456	0.1111	0.6259
GBM	3.946	1.223	3.464	-0.184		0.0702	0.1795	0.3493	0.0368	0.4587
GLM	2.259	-0.616	2.119	-1.566	-1.833		0.0174	0.4862	0.6581	0.0354
MARS	3.540	1.977	3.163	1.122	1.353	2.424		0.0576	0.0140	0.4197
MAXENT	2.693	0.175	1.947	-0.948	-0.941	0.699	-1.923		0.3608	0.1653
MDA	1.961	-0.943	0.940	-1.609	-2.120	-0.444	-2.506	-0.919		0.0211
RF	3.596	1.692	3.093	0.489	0.744	2.136	-0.811	1.399	2.348	

Table A3. Pair-wise comparison of the transferability of the 10 model types, based on models for all 90 study species, and the model sensitivity values from interpolative vs. extrapolative validation. The lower half of the matrix contains test statistics from paired t-tests, and the upper half shows their corresponding statistical significance (p-values). P-values significant at the Bonferroni-corrected p-value level (0.0011 for the 45 model-by-model comparisons) are shown in bold.

	ANN	CTA	GAM	GARP	GBM	GLM	MARS	MAXENT	MDA	RF
ANN		0.0256	0.0004	<0.0001	0.0723	0.0015	0.0765	0.0028	<0.0001	0.0216
CTA	-2.270		0.0643	<0.0001	0.5061	0.1617	0.4392	0.1807	0.0008	0.6000
GAM	-3.663	-1.8731		<0.0001	0.0035	0.3642	0.8992	0.8356	0.0330	0.2668
GARP	4.897	6.992	9.120		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
GBM	-1.819	0.668	3.002	7.626		0.0195	0.2944	0.0239	<0.0001	0.2796
GLM	-3.267	-1.411	0.912	8.762	-2.278		0.9069	0.7860	0.0117	0.4896
MARS	-1.792	-0.777	0.127	4.345	-1.055	-0.117		0.9842	0.2367	0.6426
MAXENT	-3.076	-1.349	0.208	6.996	-2.298	-0.272	-0.020		0.0676	0.3935
MDA	-5.768	-3.462	-2.166	8.985	-4.514	-2.574	-1.191	1.850		0.0063
RF	-2.339	-0.5263	1.118	6.697	-1.088	0.694	0.466	-0.857	2.796	

Table A4. Pair-wise comparison of the transferability of the 10 model types, based on models for all 90 study species, and the model specificity values from interpolative vs. extrapolative validation. The lower half of the matrix contains test statistics from paired t-tests, and the upper half shows their corresponding statistical significance (p-values). P-values significant at the Bonferroni-corrected p-value level (0.0011 for the 45 model-by-model comparisons) are shown in bold.

	ANN	CTA	GAM	GARP	GBM	GLM	MARS	MAXENT	MDA	RF
ANN		0.0001	<0.0001	0.0413	<0.0001	<0.0001	0.1136	<0.0001	<0.0001	<0.0001
CTA	3.976		0.1613	<0.0001	0.3417	0.1165	0.1036	0.1533	0.0005	0.0280
GAM	4.786	1.412		<0.0001	0.2867	0.6247	0.1001	0.9867	0.0454	0.4349
GARP	-2.070	-6.132	-7.870		<0.0001	<0.0001	0.1188	<0.0001	<0.0001	<0.0001
GBM	5.341	0.956	-1.072	-7.659		0.1709	0.1018	0.2825	0.0002	0.0480
GLM	4.897	1.585	0.491	-7.191	1.380		0.0994	0.6994	0.1266	0.6456
MARS	-1.598	-1.645	-1.662	1.575	-1.653	-1.665		0.1000	0.0969	0.0986
MAXENT	4.971	1.440	-0.017	-7.222	1.081	-0.387	1.662		0.0476	0.3534
MDA	6.716	3.608	2.023	-9.991	3.846	1.542	1.678	-2.009		0.3014
RF	5.623	2.030	0.784	-7.912	2.005	0.462	1.669	-0.933	-1.039	