

Supplementary Information S7 – Model performance results by species and set of predictive variables.

Set of variables	Species	Eval. Metric	Eval. Metric value	Cutoff	Sensitivity	Specificity
CLIM_EFA	Qbrot	KAPPA	0.70	805	84.0	96.3
CLIM_EFA	Qbrot	TSS	0.86	603	93.5	92.4
CLIM_EFA	Qbrot	ROC	0.98	611	93.5	92.7
CLIM_EFA	Qcan	KAPPA	0.78	765	84.3	99.3
CLIM_EFA	Qcan	TSS	0.98	537	100.0	97.5
CLIM_EFA	Qcan	ROC	1.00	541	100.0	97.6
CLIM_EFA	Qcerr	KAPPA	0.97	851	94.4	100.0
CLIM_EFA	Qcerr	TSS	1.00	763	100.0	99.9
CLIM_EFA	Qcerr	ROC	1.00	762	100.0	99.9
CLIM_EFA	Qest	KAPPA	0.66	804	79.1	98.4
CLIM_EFA	Qest	TSS	0.96	534	100.0	95.8
CLIM_EFA	Qest	ROC	0.99	542	100.0	95.8
CLIM_EFA	Qfag	KAPPA	0.56	714	58.3	97.0
CLIM_EFA	Qfag	TSS	0.71	560	83.7	86.6
CLIM_EFA	Qfag	ROC	0.93	566	83.3	87.3
CLIM_EFA	Qlus	KAPPA	0.72	886	73.5	98.4
CLIM_EFA	Qlus	TSS	0.93	577	97.6	95.0
CLIM_EFA	Qlus	ROC	0.99	576	97.6	95.0
CLIM_EFA	Qmar	KAPPA	0.75	844	81.8	98.6
CLIM_EFA	Qmar	TSS	0.92	421	100.0	92.4
CLIM_EFA	Qmar	ROC	0.99	429	100.0	92.6
CLIM_EFA	Qoro	KAPPA	0.89	782	90.9	99.6
CLIM_EFA	Qoro	TSS	0.97	510	100.0	97.2
CLIM_EFA	Qoro	ROC	1.00	511	100.0	97.2
CLIM_EFA	Qpet	KAPPA	0.68	806	79.6	95.0
CLIM_EFA	Qpet	TSS	0.81	523	94.0	87.1
CLIM_EFA	Qpet	ROC	0.97	522	94.2	87.1
CLIM_EFA	Qpub	KAPPA	0.73	831	78.6	97.9
CLIM_EFA	Qpub	TSS	0.88	495	97.5	90.9
CLIM_EFA	Qpub	ROC	0.98	551	96.3	92.2
CLIM_EFA	Qpyr	KAPPA	0.56	677	74.5	87.1
CLIM_EFA	Qpyr	TSS	0.66	542	86.7	79.4
CLIM_EFA	Qpyr	ROC	0.91	462	90.8	75.3
CLIM_EFA	Qrob	KAPPA	0.64	850	69.9	96.0
CLIM_EFA	Qrob	TSS	0.83	519	96.2	86.8
CLIM_EFA	Qrob	ROC	0.97	508	96.4	86.6
CLIM_EFA	Qsub	KAPPA	0.76	749	80.5	97.6
CLIM_EFA	Qsub	TSS	0.88	364	96.8	90.6
CLIM_EFA	Qsub	ROC	0.98	365	96.8	90.7
CLIM_only	Qbrot	KAPPA	0.68	866	73.3	97.4
CLIM_only	Qbrot	TSS	0.84	550	93.5	90.7
CLIM_only	Qbrot	ROC	0.98	551	93.5	90.8
CLIM_only	Qcan	KAPPA	0.67	858	68.6	99.2
CLIM_only	Qcan	TSS	0.90	576	96.1	94.2
CLIM_only	Qcan	ROC	0.99	577	96.1	94.2
CLIM_only	Qcerr	KAPPA	0.97	723	100.0	99.9
CLIM_only	Qcerr	TSS	1.00	723	100.0	99.9
CLIM_only	Qcerr	ROC	1.00	723	100.0	99.9

CLIM_only	Qest	KAPPA	0.52	871	63.6	98.0
CLIM_only	Qest	TSS	0.91	490	100.0	91.4
CLIM_only	Qest	ROC	0.98	496	100.0	91.5
CLIM_only	Qfag	KAPPA	0.51	703	60.0	95.7
CLIM_only	Qfag	TSS	0.70	491	89.3	80.7
CLIM_only	Qfag	ROC	0.93	497	89.0	81.1
CLIM_only	Qlus	KAPPA	0.71	860	88.2	97.1
CLIM_only	Qlus	TSS	0.92	514	98.6	93.0
CLIM_only	Qlus	ROC	0.99	521	98.6	93.2
CLIM_only	Qmar	KAPPA	0.74	847	80.3	98.7
CLIM_only	Qmar	TSS	0.91	526	97.0	94.3
CLIM_only	Qmar	ROC	0.99	526	97.0	94.3
CLIM_only	Qoro	KAPPA	0.83	874	84.8	99.4
CLIM_only	Qoro	TSS	0.98	634	100.0	97.5
CLIM_only	Qoro	ROC	1.00	639	100.0	97.7
CLIM_only	Qpet	KAPPA	0.64	744	76.9	94.5
CLIM_only	Qpet	TSS	0.81	464	94.0	86.8
CLIM_only	Qpet	ROC	0.96	461	94.1	86.7
CLIM_only	Qpub	KAPPA	0.71	785	76.0	97.8
CLIM_only	Qpub	TSS	0.89	510	96.6	92.3
CLIM_only	Qpub	ROC	0.98	516	96.6	92.4
CLIM_only	Qpyr	KAPPA	0.55	675	76.4	85.8
CLIM_only	Qpyr	TSS	0.66	448	92.7	73.6
CLIM_only	Qpyr	ROC	0.91	451	92.7	73.8
CLIM_only	Qrob	KAPPA	0.62	850	71.2	95.3
CLIM_only	Qrob	TSS	0.83	598	95.3	87.7
CLIM_only	Qrob	ROC	0.96	588	95.5	87.6
CLIM_only	Qsub	KAPPA	0.72	769	75.6	97.7
CLIM_only	Qsub	TSS	0.88	367	96.0	91.6
CLIM_only	Qsub	ROC	0.98	370	96.0	91.7
EFA_only	Qbrot	KAPPA	0.49	729	62.1	92.7
EFA_only	Qbrot	TSS	0.67	490	85.6	81.0
EFA_only	Qbrot	ROC	0.90	491	85.6	81.2
EFA_only	Qcan	KAPPA	0.47	829	47.1	98.3
EFA_only	Qcan	TSS	0.82	501	94.1	87.7
EFA_only	Qcan	ROC	0.96	537	92.2	89.8
EFA_only	Qcerr	KAPPA	0.75	794	77.8	99.5
EFA_only	Qcerr	TSS	0.95	498	100.0	95.2
EFA_only	Qcerr	ROC	0.99	506	100.0	95.4
EFA_only	Qest	KAPPA	0.47	744	67.4	95.5
EFA_only	Qest	TSS	0.80	379	100.0	79.7
EFA_only	Qest	ROC	0.95	381	100.0	79.7
EFA_only	Qfag	KAPPA	0.39	723	41.3	95.0
EFA_only	Qfag	TSS	0.58	504	84.0	74.1
EFA_only	Qfag	ROC	0.87	505	84.0	74.2
EFA_only	Qlus	KAPPA	0.49	733	61.4	94.5
EFA_only	Qlus	TSS	0.73	432	92.4	80.4
EFA_only	Qlus	ROC	0.93	437	92.4	80.8
EFA_only	Qmar	KAPPA	0.45	769	59.1	94.8
EFA_only	Qmar	TSS	0.71	445	90.9	79.8

EFA_only	Qmar	ROC	0.92	451	90.9	80.1
EFA_only	Qoro	KAPPA	0.80	795	81.8	98.9
EFA_only	Qoro	TSS	0.92	434	100.0	92.1
EFA_only	Qoro	ROC	0.99	431	100.0	92.1
EFA_only	Qpet	KAPPA	0.62	597	80.6	90.5
EFA_only	Qpet	TSS	0.74	469	89.9	84.6
EFA_only	Qpet	ROC	0.94	467	90.2	84.5
EFA_only	Qpub	KAPPA	0.58	764	58.5	96.9
EFA_only	Qpub	TSS	0.71	478	90.3	80.7
EFA_only	Qpub	ROC	0.94	487	90.0	81.1
EFA_only	Qpyr	KAPPA	0.49	611	71.2	81.4
EFA_only	Qpyr	TSS	0.55	535	81.7	73.1
EFA_only	Qpyr	ROC	0.86	536	81.7	73.3
EFA_only	Qrob	KAPPA	0.54	711	73.9	89.1
EFA_only	Qrob	TSS	0.71	435	92.1	78.8
EFA_only	Qrob	ROC	0.92	436	92.1	78.8
EFA_only	Qsub	KAPPA	0.48	749	55.4	93.8
EFA_only	Qsub	TSS	0.64	556	84.4	79.9
EFA_only	Qsub	ROC	0.90	553	84.9	79.6