Online Resource 1 — Supplementary tables

Article: Hydroclimate associations do not ensure temporal or spatial transferability of positive *Anopheles* catch intensity in southwestern Colombia

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Authors: Johan Ceballos; Andrea Camila Silva Cordero

Affiliation: Universidad Nacional de Colombia, Sede de La Paz, Kilómetro 9 Vía Valledupar–La Paz, La Paz, Cesar 202017, Colombia. Corresponding author: ansilvaco@unal.edu.co

Supplementary tables are generated directly from the verified outputs of the successful MATLAB run. They provide audit and sensitivity detail without changing the primary analysis.

Table S1 Complete source-data audit

Metric	Value	Unit	Notes
source_rows	1502	rows	Pinned Darwin Core v1.0
source_individual_count	229394	mosquitoes	Must equal publisher total
missing_or_invalid_dates	20	rows	Excluded; dates are never imputed
coordinates_imputed_from_parent	92	rows	Only one unambiguous published coordinate pair
unresolved_coordinates_after_rule	0	rows	Excluded if greater than zero
analytical_duplicate_extra_rows	2	rows	Kept primary; removed in sensitivity
analysis_eligible_rows	1482	rows	Before climate completeness gate
source_rows_Anopheles_albimanus	504	rows	Source
source_individuals_Anopheles_albimanus	34424	mosquitoes	Source
eligible_rows_Anopheles_albimanus	496	rows	Analysis
source_rows_Anopheles_neivai	823	rows	Source
source_individuals_Anopheles_neivai	194356	mosquitoes	Source
eligible_rows_Anopheles_neivai	812	rows	Analysis
source_rows_Anopheles_apicimacula	175	rows	Source
source_individuals_Anopheles_apicimacula	614	mosquitoes	Source
eligible_rows_Anopheles_apicimacula	174	rows	Analysis

Table S2 Prespecified species-level data gates

Species	Total n	Train n	Validation n	Test n	Clusters	Train clusters	Validation clusters	Test clusters	Climate complete	Max |r|	Condition no.	Gate	Reason
Anopheles albimanus	496	203	229	64	52	49	36	30	1.000	0.658	7.358	Pass	passed
Anopheles neivai	812	329	384	99	54	54	40	35	1.000	0.635	7.434	Pass	passed
Anopheles apicimacula	174	74	88	12	35	27	28	9	1.000	NA	NA	Fail	failed:n_training|n_validation|n_test

Table S3 Cluster-bootstrap convergence audit

Species	Requested	Converged	Convergence fraction	Bootstrap gate
Anopheles albimanus	200	196	98.0%	Pass
Anopheles neivai	200	193	96.5%	Pass

Table S4 All-year full and seasonal–administrative baseline model comparison

Species	n	AIC full	AIC baseline	Baseline − full AIC	Theta	Converged
Anopheles albimanus	496	4404.232	4424.713	20.482	0.029926	Yes
Anopheles neivai	812	10135.390	10179.010	43.620	0.784347	Yes

Table S5 Climate-coefficient sensitivity analyses

Species	Scenario	n	Clusters	Predictor	beta	95% CI	Converged
Anopheles albimanus	Primary	496	52	Event temperature	-1.482	-2.817 to -0.146	Yes
Anopheles albimanus	Primary	496	52	Event relative humidity	-0.511	-1.188 to 0.167	Yes
Anopheles albimanus	Primary	496	52	Event mean rainfall	-0.113	-0.263 to 0.038	Yes
Anopheles albimanus	Primary	496	52	14-day antecedent rainfall	-0.050	-0.333 to 0.234	Yes
Anopheles albimanus	Exclude duplicate extras	496	52	Event temperature	-1.482	-2.817 to -0.146	Yes
Anopheles albimanus	Exclude duplicate extras	496	52	Event relative humidity	-0.511	-1.188 to 0.167	Yes
Anopheles albimanus	Exclude duplicate extras	496	52	Event mean rainfall	-0.113	-0.263 to 0.038	Yes
Anopheles albimanus	Exclude duplicate extras	496	52	14-day antecedent rainfall	-0.050	-0.333 to 0.234	Yes
Anopheles albimanus	Exclude coordinate-imputed rows	456	52	Event temperature	-1.687	-2.471 to -0.903	Yes
Anopheles albimanus	Exclude coordinate-imputed rows	456	52	Event relative humidity	-0.357	-0.777 to 0.063	Yes
Anopheles albimanus	Exclude coordinate-imputed rows	456	52	Event mean rainfall	-0.157	-0.259 to -0.056	Yes
Anopheles albimanus	Exclude coordinate-imputed rows	456	52	14-day antecedent rainfall	-0.182	-0.433 to 0.069	Yes
Anopheles albimanus	Intervals ≤14 days	224	47	Event temperature	-0.948	-1.918 to 0.022	Yes
Anopheles albimanus	Intervals ≤14 days	224	47	Event relative humidity	-0.204	-1.027 to 0.620	Yes
Anopheles albimanus	Intervals ≤14 days	224	47	Event mean rainfall	-0.178	-0.370 to 0.015	Yes
Anopheles albimanus	Intervals ≤14 days	224	47	14-day antecedent rainfall	-0.214	-0.626 to 0.198	Yes
Anopheles neivai	Primary	812	54	Event temperature	0.453	0.101 to 0.805	Yes
Anopheles neivai	Primary	812	54	Event relative humidity	0.100	-0.048 to 0.247	Yes
Anopheles neivai	Primary	812	54	Event mean rainfall	0.013	-0.055 to 0.081	Yes
Anopheles neivai	Primary	812	54	14-day antecedent rainfall	0.132	0.039 to 0.226	Yes
Anopheles neivai	Exclude duplicate extras	810	54	Event temperature	0.454	0.101 to 0.806	Yes
Anopheles neivai	Exclude duplicate extras	810	54	Event relative humidity	0.101	-0.047 to 0.248	Yes
Anopheles neivai	Exclude duplicate extras	810	54	Event mean rainfall	0.013	-0.055 to 0.081	Yes
Anopheles neivai	Exclude duplicate extras	810	54	14-day antecedent rainfall	0.131	0.038 to 0.225	Yes
Anopheles neivai	Exclude coordinate-imputed rows	772	54	Event temperature	0.468	0.109 to 0.826	Yes

Species	Scenario	n	Clusters	Predictor	beta	95% CI	Converged
Anopheles neivai	Exclude coordinate-imputed rows	772	54	Event relative humidity	0.095	-0.058 to 0.247	Yes
Anopheles neivai	Exclude coordinate-imputed rows	772	54	Event mean rainfall	0.013	-0.056 to 0.083	Yes
Anopheles neivai	Exclude coordinate-imputed rows	772	54	14-day antecedent rainfall	0.134	0.039 to 0.230	Yes
Anopheles neivai	Intervals ≤14 days	380	51	Event temperature	0.492	0.156 to 0.827	Yes
Anopheles neivai	Intervals ≤14 days	380	51	Event relative humidity	0.047	-0.166 to 0.261	Yes
Anopheles neivai	Intervals ≤14 days	380	51	Event mean rainfall	0.014	-0.082 to 0.110	Yes
Anopheles neivai	Intervals ≤14 days	380	51	14-day antecedent rainfall	0.163	-0.037 to 0.363	Yes

Table S6 Complete training, validation, and test metrics for full and baseline models

Species	Split	Model	n	Clusters	MAE rate	RMSE log-rate	Spearman	Observed/predicted	Mean log score
Anopheles albimanus	Training	Full	203	49	2.505	0.809	0.539	0.865	-4.543
Anopheles albimanus	Training	Baseline	203	49	2.455	0.860	0.264	1.043	-4.601
Anopheles albimanus	Validation	Full	229	36	3.119	0.983	0.521	0.562	-4.450
Anopheles albimanus	Validation	Baseline	229	36	2.271	0.873	0.280	0.884	-4.443
Anopheles albimanus	Test	Full	64	30	4.111	1.257	0.331	0.161	-4.139
Anopheles albimanus	Test	Baseline	64	30	1.851	0.931	0.144	0.337	-4.066
Anopheles neivai	Training	Full	329	54	3.693	0.835	0.432	0.990	-5.980
Anopheles neivai	Training	Baseline	329	54	3.905	0.908	0.201	0.975	-6.024
Anopheles neivai	Validation	Full	384	40	4.853	0.900	0.317	1.668	-6.583
Anopheles neivai	Validation	Baseline	384	40	5.016	0.961	0.160	1.385	-6.504
Anopheles neivai	Test	Full	99	35	3.231	0.789	0.277	0.982	-6.323
Anopheles neivai	Test	Baseline	99	35	3.217	0.826	0.294	0.926	-6.316

Table S7 Multiplicity adjustment and effects translated to natural predictor increments

Species	Predictor	Standardized beta	Raw p	BH q	Observed range	SD	Multiplier (95% CI)	Increment
Anopheles albimanus	Event temperature	-1.482	0.030	0.079	22.052 to 27.690	1.673	0.412 (0.186 to 0.916)	per 1 degree C
Anopheles albimanus	Event relative humidity	-0.511	0.139	0.227	70.450 to 92.890	3.493	0.481 (0.183 to 1.269)	per 5 percentage points
Anopheles albimanus	Event mean rainfall	-0.113	0.142	0.227	0.140 to 179.900	10.145	0.895 (0.772 to 1.038)	per 10 mm/day
Anopheles albimanus	14-day antecedent rainfall	-0.050	0.731	0.731	11.330 to 504.780	56.080	0.957 (0.743 to 1.232)	per 50 mm/14 days
Anopheles neivai	Event temperature	0.453	0.012	0.047	22.052 to 27.690	1.391	1.385 (1.075 to 1.784)	per 1 degree C
Anopheles neivai	Event relative humidity	0.100	0.185	0.246	70.450 to 92.710	3.751	1.142 (0.938 to 1.391)	per 5 percentage points
Anopheles neivai	Event mean rainfall	0.013	0.703	0.731	0.140 to 179.900	10.831	1.012 (0.951 to 1.078)	per 10 mm/day
Anopheles neivai	14-day antecedent rainfall	0.132	0.005	0.044	7.450 to 504.780	64.225	1.108 (1.031 to 1.192)	per 50 mm/14 days

The Benjamini–Hochberg procedure was applied jointly to eight species-by-climate tests. Multipliers describe the underlying negative-binomial mean parameter within the observed support and are not causal effects or unconditional abundance ratios.

Table S8 Full-design variance inflation factors, climate correlations, and design condition numbers

Species	Predictor	Full-design VIF	All-year max |r|	Partner	Signed r	Training max |r|	Condition no.	n
Anopheles albimanus	Event temperature	3.124	0.642	Event relative humidity	-0.642	0.658	6.490	496
Anopheles albimanus	Event relative humidity	2.972	0.642	Event temperature	-0.642	0.658	6.490	496
Anopheles albimanus	Event mean rainfall	1.167	0.343	Event relative humidity	0.343	0.658	6.490	496
Anopheles albimanus	14-day antecedent rainfall	1.467	0.505	Event relative humidity	0.505	0.658	6.490	496
Anopheles neivai	Event temperature	2.474	0.612	Event relative humidity	-0.612	0.635	6.838	812
Anopheles neivai	Event relative humidity	2.840	0.612	Event temperature	-0.612	0.635	6.838	812
Anopheles neivai	Event mean rainfall	1.186	0.369	Event relative humidity	0.369	0.635	6.838	812
Anopheles neivai	14-day antecedent rainfall	1.491	0.508	Event relative humidity	0.508	0.635	6.838	812

Table S9 Conditional goodness-of-fit diagnostics for final all-year models

Species	n	Theta	Observed mean	Predicted conditional mean	Pearson dispersion	Mid-quantile mean	Mid-quantile SD	Max CDF distance
Anopheles albimanus	496	0.02993	68.034	77.849	1.378	-0.009	0.968	0.072
Anopheles neivai	812	0.78435	236.102	232.143	0.976	-0.004	1.018	0.031

Conditional means and variances account for zero truncation. Mid-quantile residuals are deterministic and avoid simulation noise. The associated plots are supplied as Supplementary Fig. S1.

Table S10 Conditional uncertainty for leave-one-parentEventID-out spatial transfer metrics

Species	Metric	Estimate	Unit-resampling 95% interval	Predictions	Held-out units	Resamples
Anopheles albimanus	MAE positive-catch rate	2.738	1.615 to 3.999	483	39	2000
Anopheles albimanus	RMSE log(1 + positive-catch rate)	0.927	0.749 to 1.074	483	39	2000
Anopheles albimanus	Spearman rank correlation	0.342	0.056 to 0.578	483	39	2000
Anopheles albimanus	Observed/predicted aggregate count	0.692	0.284 to 1.474	483	39	2000
Anopheles neivai	MAE positive-catch rate	4.292	3.750 to 4.852	801	43	2000
Anopheles neivai	RMSE log(1 + positive-catch rate)	0.901	0.826 to 0.984	801	43	2000
Anopheles neivai	Spearman rank correlation	0.358	0.201 to 0.507	801	43	2000
Anopheles neivai	Observed/predicted aggregate count	1.013	0.810 to 1.221	801	43	2000

Intervals were obtained from 2,000 deterministic resamples of held-out units and are conditional on the locked fold predictions. They describe variation among held-out units and do not include training-model refitting uncertainty.