

Supplementary Information

Climate-driven models reveal temporal trends in *Aedes* breeding: Implications for outbreak preparedness and control interventions

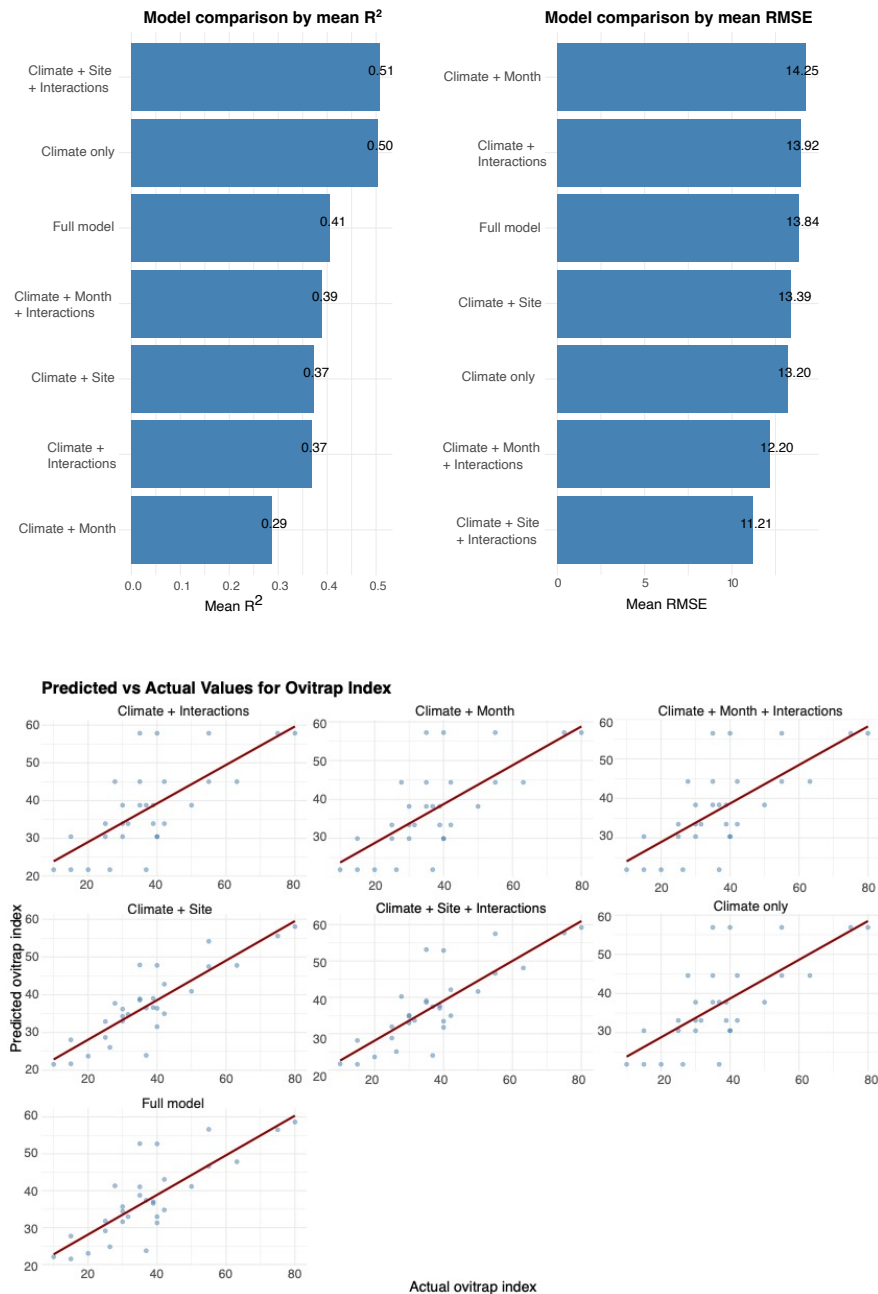
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Fig S1: Cross-validation results from Random Forest models. Bar plot of mean R^2 and RMSE (Root Mean Squared Error) values from cross-validation for each model. Higher R^2 values indicate better model fit, and RMSE showing prediction error. Lower RMSE values reflect more accurate models. Scatter plots show the predicted ovitrap index against the actual values for each of the seven models. The red line represents the 1:1 relationship indicating perfect prediction.

A Prediction of ovitrap positivity



B Predicting container positivity

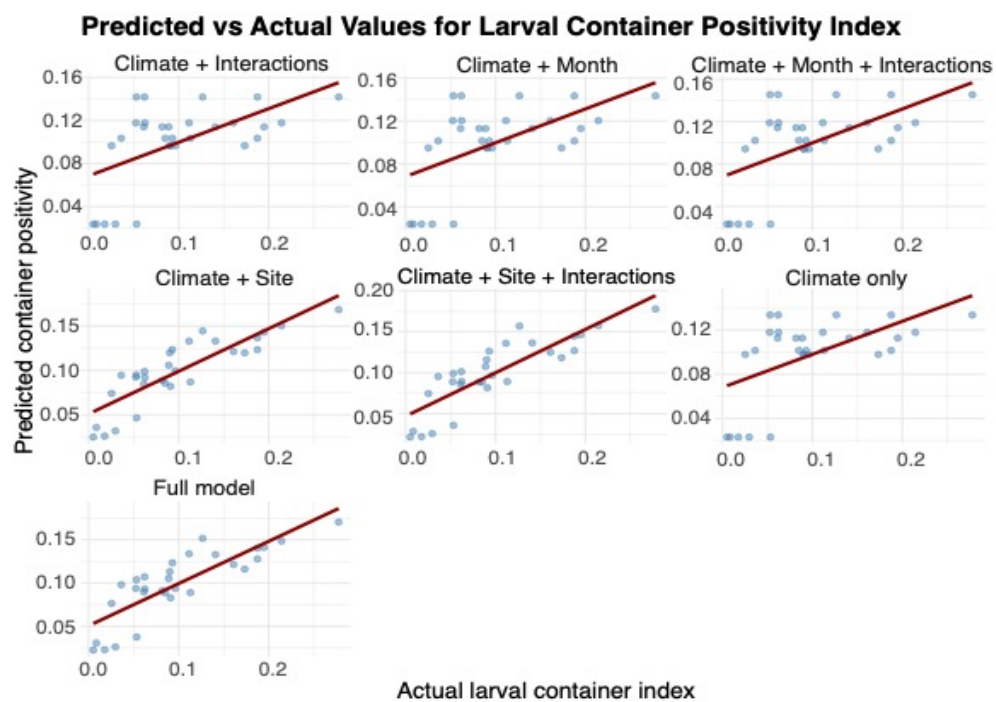
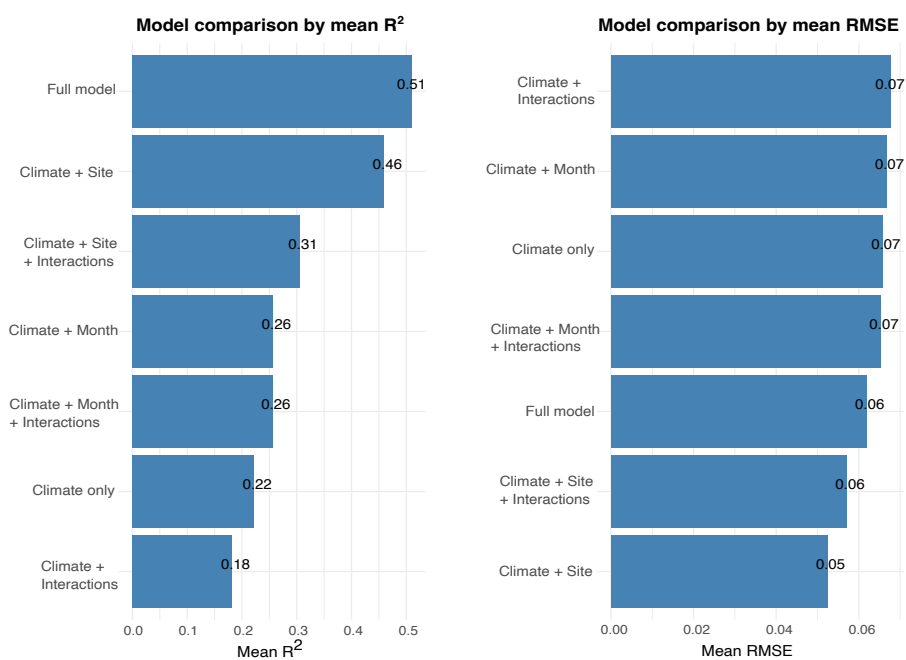
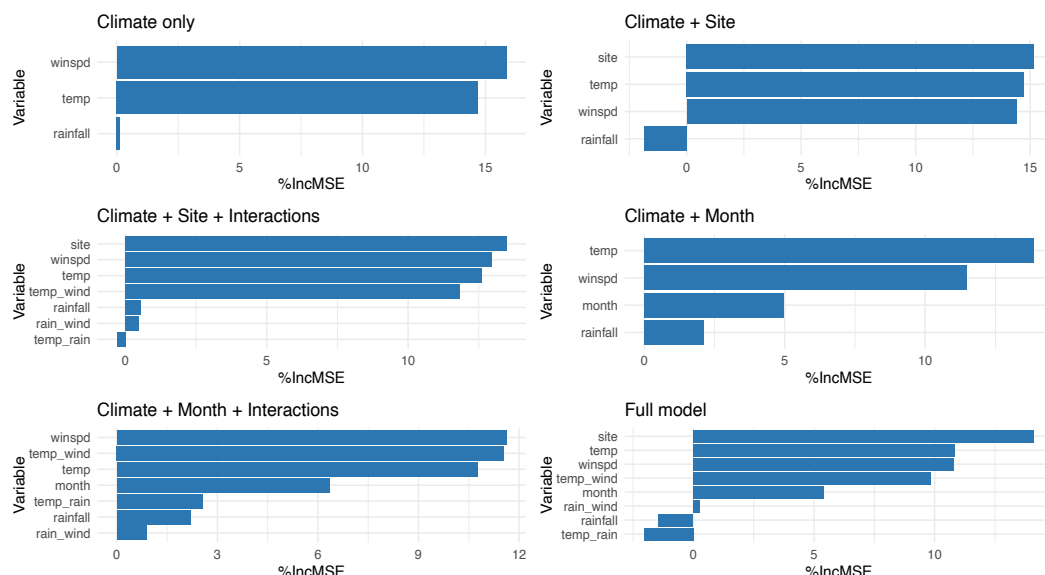
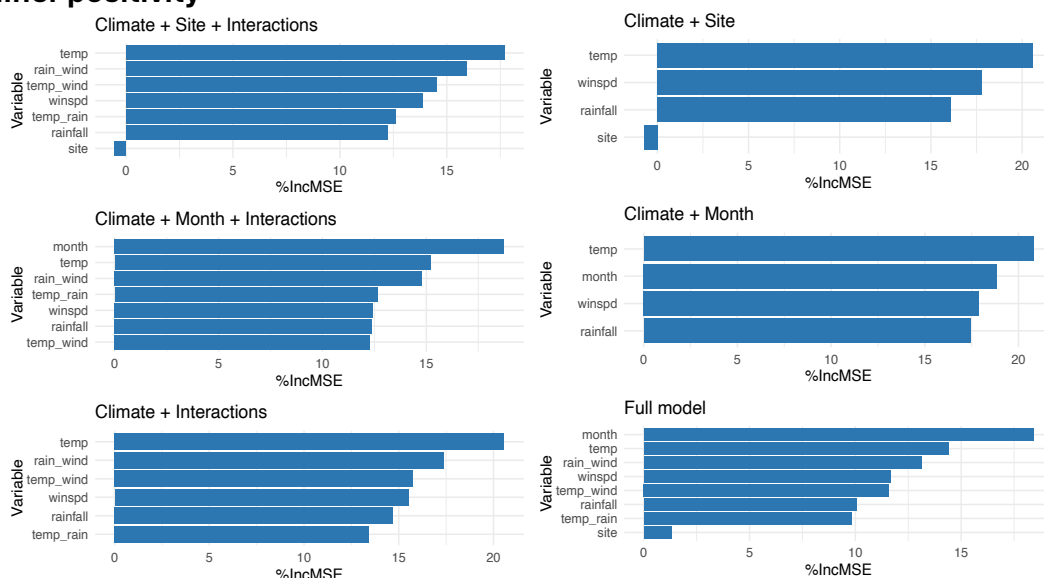


Fig S2: Variable importance plots from the remaining six Random Forest models tested, predicting *Aedes* ovitrap positivity and larval container positivity across different combinations of predictor variables.

A Ovitrap positivity



B Container positivity



Each panel shows the top contributing variables to the respective model, measured by **percentage increase in mean squared error (%IncMSE)**—a metric reflecting how much prediction error increases when that variable is permuted. Higher values indicate greater importance in model performance.

Ovitrap index models (A): Temperature and wind speed consistently rank as the most important predictors, especially in the "Climate only" and "Climate + Site" models. When site or interaction

terms are included, site and its interactions also gain importance. Rainfall generally ranks lower, though its importance increases when included in interaction terms (e.g., temp_rain, rain_wind).

Container larval positivity models (B): Similar to ovitrap models, temperature and wind speed are top contributors across most models. However, rainfall and its interactions (particularly rain_wind and temp_rain) appear more frequently as important predictors in these models. Month becomes a dominant contributor in models that include temporal components.

Fig S3: Weather parameters for 2022. Red horizontal line is the mean.

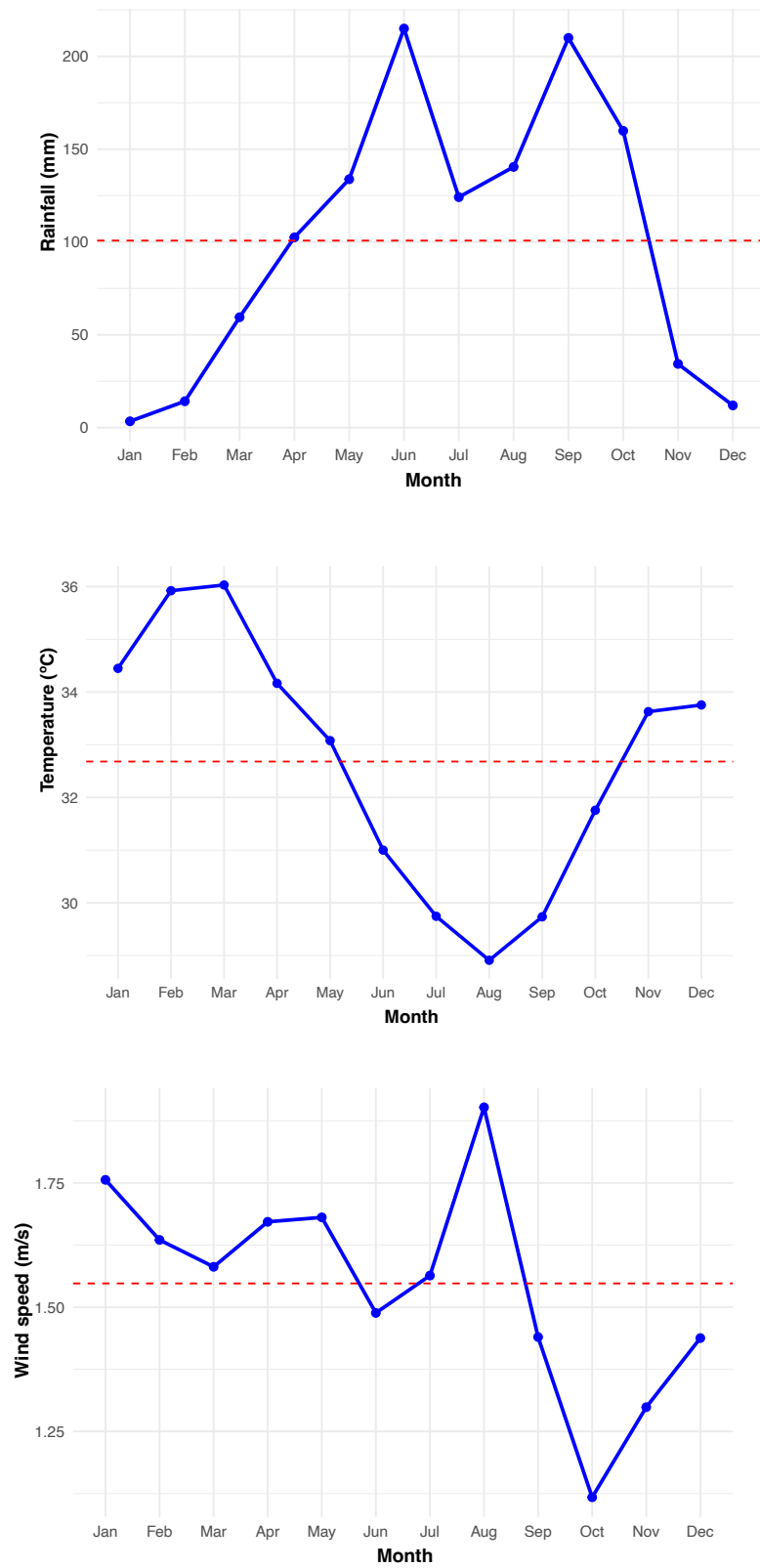


Fig S4: Monthly predicted POI and container positivity for each of the 7 years examined.

