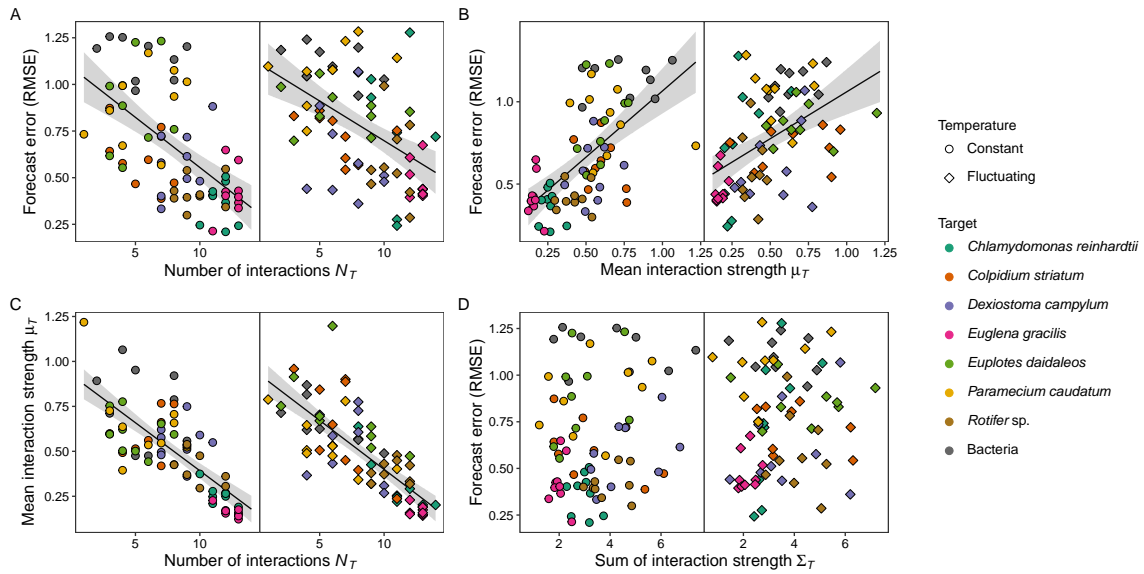# 1 Figures

2 Fig. 1: Species with more but weaker interactions are predicted better. **A-B:** Forecast error
3 (RMSE) respectively as a function of the number of interactions (**A**) and the mean interaction strength
4 (**B**). **C**: The relation between the number of interactions and the mean interaction strength. **D**: Forecast
5 error (RMSE) as a function of the sum of interaction strengths. The black line represents the fit of the
6 respective regression models, and the shaded regions indicate the corresponding 95% confidence intervals. In
7 each sub-figure the left and the right panel show the data for the constant and the fluctuating temperature
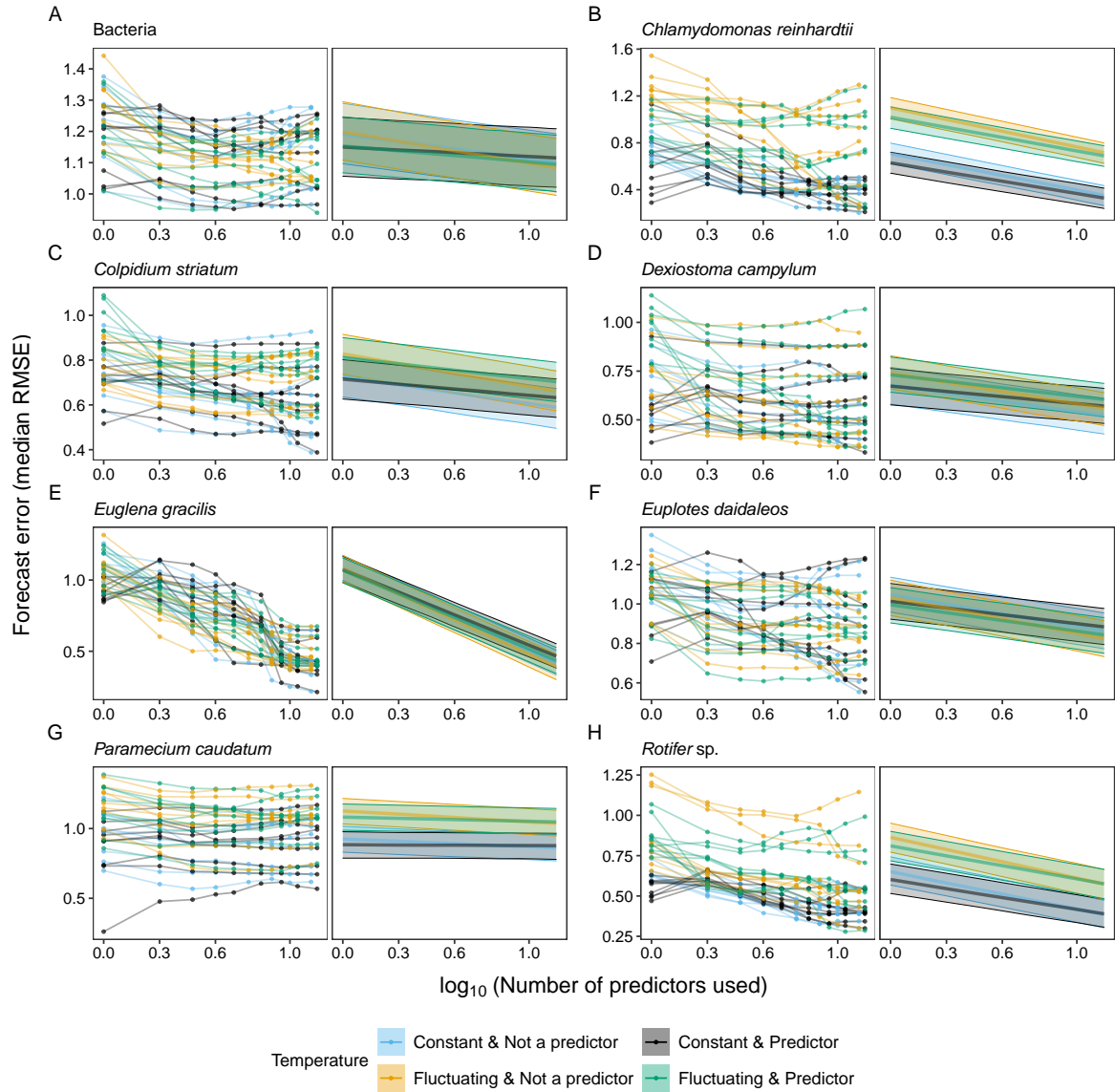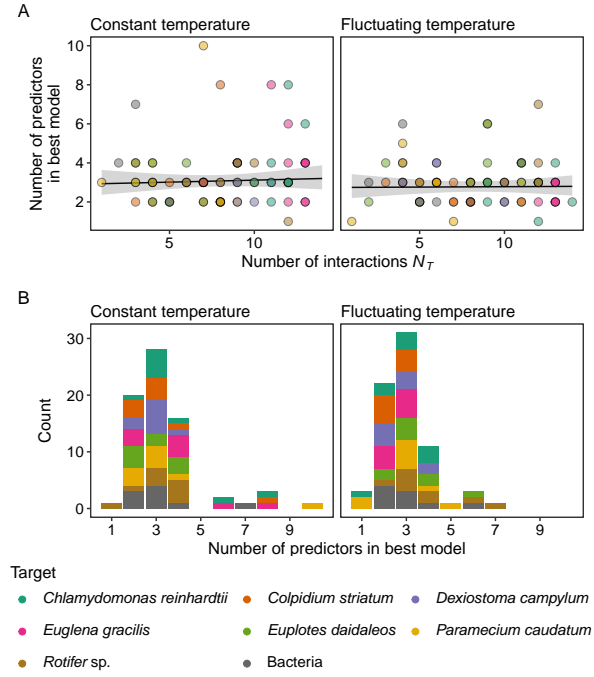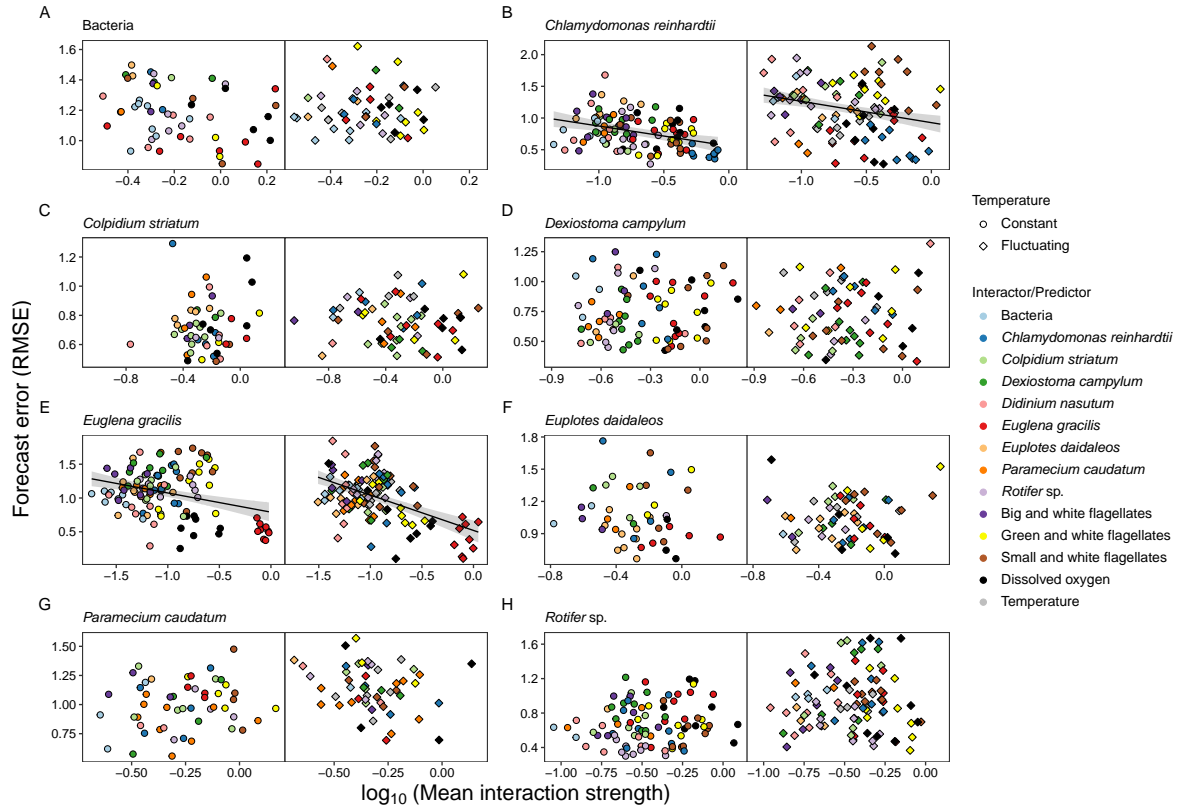8 case, respectively.

Fig. 2: Median forecast error of species abundance decreases the more state variables are used as predictors. Median forecast error as a function of the number of predictors used in the forecast model, of the predicted target species (sub-figures), of the temperature regime and of whether temperature was used as a predictor (color). In each sub-figure, the left panel shows the data as a scatter plot with the points connected with solid lines if they come from the same replicate, while in the right panel the solid lines represent the fit of the fitted regression model, and the shaded regions indicate the corresponding 95% confidence intervals. **A**: Bacteria. **B**: *Chlamydomonas reinhardtii*. **C**: *Colpidium striatum*. **D**: *Dexiostoma campylum*. **E**: *Euglena gracilis*. **F**: *Euplotes daidaleos*. **G**: *Paramecium caudatum*. **H**: *Rotifer* sp.

Fig. 3: The best forecast models consistently contained only few predictors, regardless of the number of interactions. **A**: The relation between the number of predictors in the best forecast models and the number of interactions of the predicted species. The black lines represent the fit of the regression model, and the shaded regions indicate the corresponding 95% confidence intervals. **B**: Bar plot of the number of predictors in the best forecast models. The left panels are for the constant temperature case, the right ones for the fluctuating temperature case.

Fig. 4: How strongly a species interacts with a target does not influence how well the species predicts the abundance of the target. The forecast error (RMSE) of the abundance of a target species with a model having only one species as predictor as a function of the interaction strength between the predictor and the predicted target. The black lines show the fit of the regression model, and the shaded regions indicate the corresponding 95% confidence intervals. The left panels are for the constant temperature case, the right ones for the fluctuating temperature case. **A**: Bacteria. **B**: *Chlamydomonas reinhardtii*. **C**: *Colpidium striatum*. **D**: *Dexiostoma campylum*. **E**: *Euglena gracilis*. **F**: *Euplotes daidaleos*. **G**: *Paramecium caudatum*. **H**: *Rotifer* sp.