Intraspecific variation in thermal tolerance differs between tropical and temperate fishes

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Supplementary Methods and Results

1) **Model selection approach:** to test differences in intraspecific variation in CT_{max} between two relevant latitudinal groups, habitat types, hemisphere effect and methodology effects.

PGLS models from the most complex to the simple one:

Model 1 : $\log_{10}$ S.D. $CT_{max} \sim \alpha_0 + \alpha_1$ Latitudinal position + α_2 Habitat + $\alpha_3$delta Temperature+ α_4 Hemisphere + α_5 Number of individuals used + α_6 Latitudinal position x delta Temperature + ε

Model 2 : $\log_{10}$ S.D. $CT_{max} \sim \alpha_0 + \alpha_1$ Latitudinal position + α_2 Habitat + $\alpha_3$delta Temperature + α_4 Hemisphere + α_5 Number of individuals used + ε

Model 3 : $\log_{10}$ S.D. $CT_{max} \sim \alpha_0 + \alpha_1$ Latitudinal position + α_2 Habitat + $\alpha_3$delta Temperature + α_4 Hemisphere + ε

Model 4 : $\log_{10}$ S.D. $CT_{max} \sim \alpha_0 + \alpha_1$ Latitudinal position + α_2 Habitat + $\alpha_3$delta Temperature + ε

Model 5 : $\log_{10}$ S.D. $CT_{max} \sim \alpha_0 + \alpha_1$ Latitudinal position + α_2 Habitat + ε

Model 6 : $\log_{10}$ S.D. $CT_{max} \sim \alpha_0 + \alpha_1$ Latitudinal position + ε

Model 7 : $\log_{10}$ S.D. $CT_{max} \sim \alpha_0 + \varepsilon$

Supplementary Table 1: PGLS model selection approach by AIC function on 203 fish species. Selected model is model 1 due to lowest AIC value.

N species	models	df	AIC
203	Model 1	7	268.5
	Model 2	6	277.3
	Model 3	5	279.8
	Model 4	4	313
	Model 5	3	327.7
	Model 6	2	330.2
	Model 7	1	344.5

2) Phylogenetic informed analysis on intraspecific variation of CT_{max} in 203 species

Model 1 : $\log_{10}$ S.D. $CT_{max} \sim \alpha_0 + \alpha_1$ Latitudinal position + α_2 Habitat + $\alpha_3$delta Temperature + α_4 Hemisphere + α_5 Number of individuals used + α_6 Latitudinal position x delta Temperature + ε

Supplementary Table 2: PGLS model summary, $F_{6,195} = 4.397$, $\lambda = 0.553$, $R^2 = 11.92$, $p < 0.001$ on 203 fish species.

N species	coefficients	estimates	s.e.	t values	p values
203	Intercept	-0.393	0.184	-2.137	0.034
	Tropical species	-0.51	0.248	-2.054	0.041
	Marine species	-0.115	0.068	-1.683	0.094
	Delta Temperature	0.014	0.007	1.972	0.05
	Southern Hemisphere	0.151	0.065	2.318	0.022
	Individuals	0.002	0.002	0.846	0.399
	Tropical sp*delta Temperature	0.038	0.019	1.95	0.053

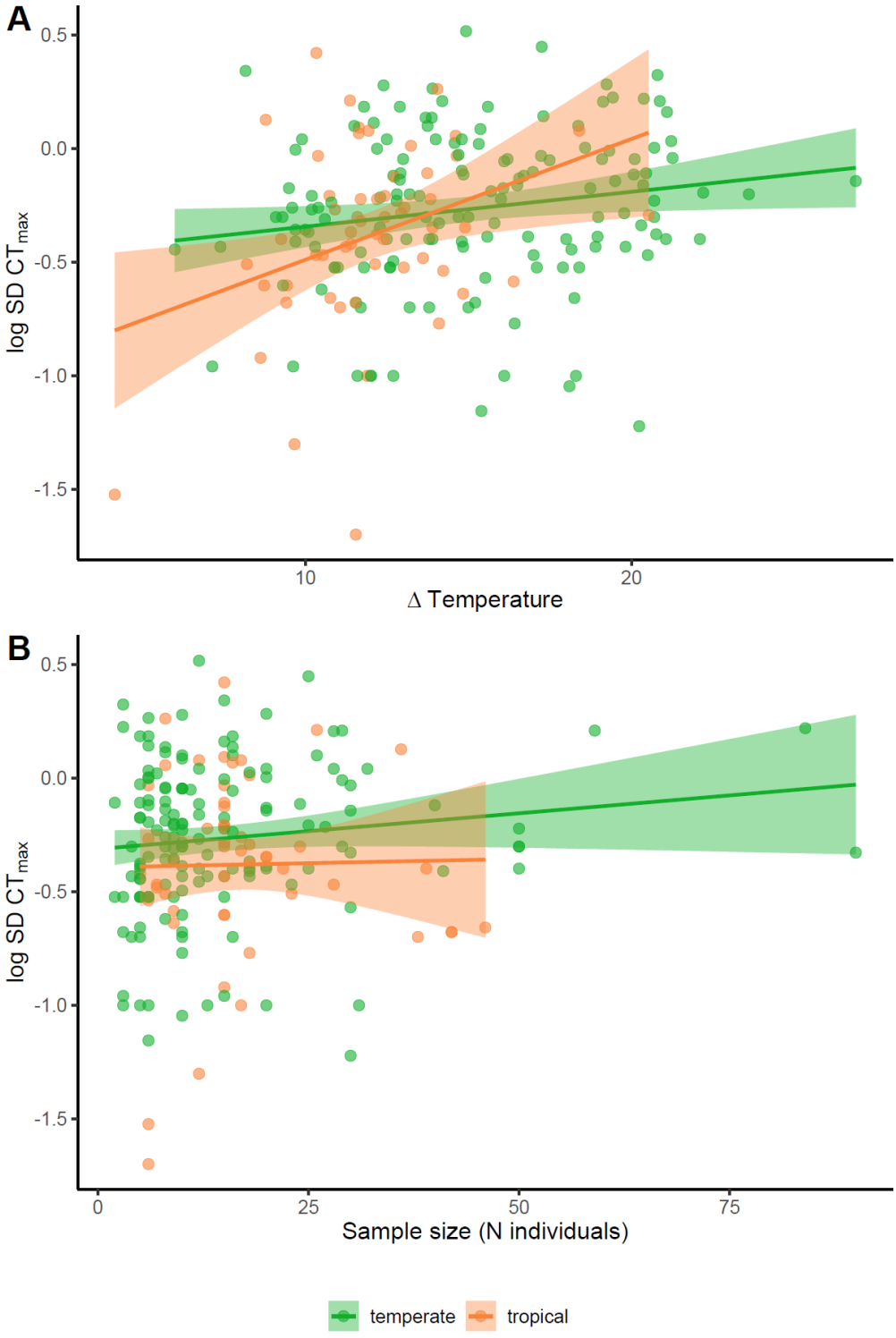

Figure S1| The effect of (A) delta temperature and (B) the number of individuals used in each study on log_{10} transformed standard deviation of CT_{max} (log_{10} S.D. CT_{max}) divided by two latitudinal groups (tropical and temperate species). The shaded areas in the regression lines correspond to 95% of confidence interval.

3) GLM analysis on intraspecific variation CT_{max} in 203 species

Supplementary Table 3: GLM model summary on $\log_{10}$ S.D.CT_{max}, $F_{6,196} = 4.24$, $R^2 = 11.49$, $p < 0.001$ in 203 fish species.

N species	coefficients	estimates	s.e.	t values	p values
203	Intercept	-0.483	0.115	-4.210	< 0.001
	Tropical species	-0.529	0.26	-2.038	0.043
	Marine species	-0.095	0.053	-1.790	0.075
	Delta Temperature	0.013	0.007	1.751	0.082
	Southern Hemisphere	0.123	0.067	1.842	0.067
	Individuals	0.002	0.002	1.283	0.201
	Tropical sp*Delta Temperature	0.037	0.02	1.818	0.071

4) Supplementary Figures

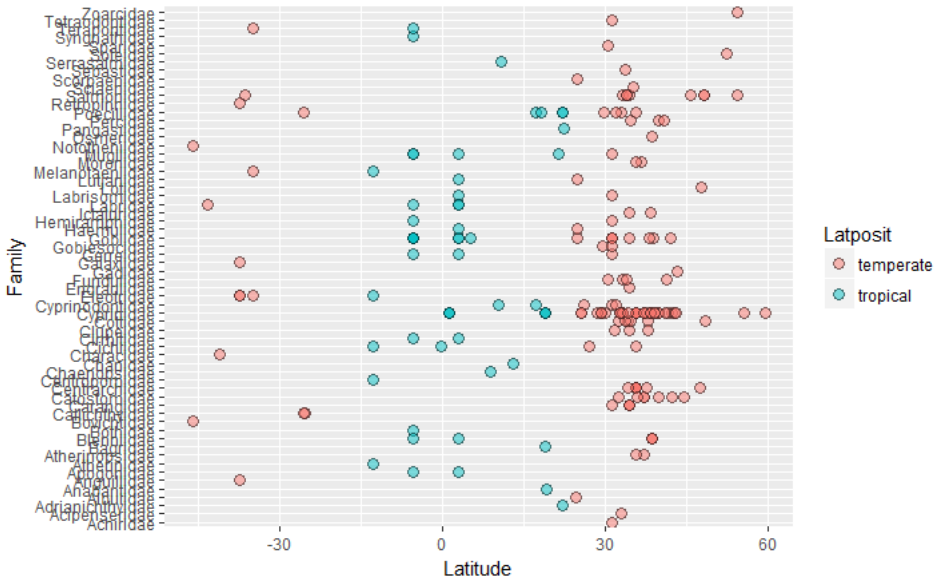

Figure S2| Representation of family across latitude divided in two latitudinal groups. red dot temperate species, blue dots in tropical species.

5) Phylogenetic tree

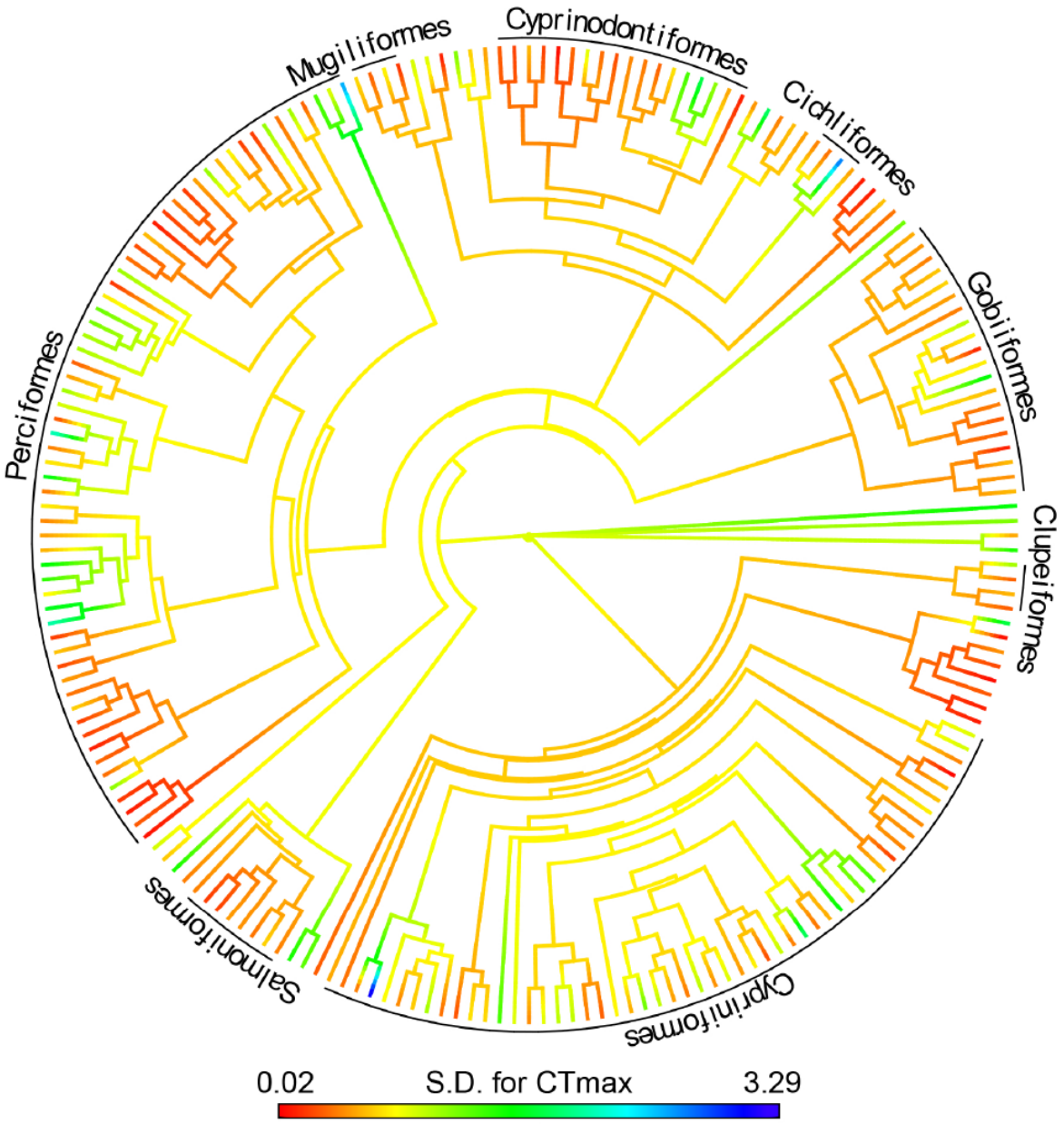

Figure S3| Phylogenetic tree of 203 species and their families, organised according to their intraspecific variation in upper thermal tolerance, estimated as the standard deviation of their CT_{max} (S.D. for CT_{max}).