

{rokbox title=|Patterns of sex determination in species with temperature-dependent sex determination (TSD) :: Image: Authors|
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Pilar Santidrián Tomillo, 2024. [Re-Equilibrating Sex Ratios: Adjustment of Reaction Norms in Species With Temperature-Dependent Sex Determination.](https://doi.org/10.1111/gcb.17568)

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Abstract: Fisher's general principle for sex allocation holds that population sex ratios are typically balanced because parents producing the rare sex are benefited and the rare sex alternates over time. In species that have temperature-dependent sex determination (TSD), thermal reaction norms need to be adjusted at the population level to avoid extremely biased sex ratios and extinction. Extant species with TSD experienced drastic climatic changes in the geological past and must necessarily have mechanisms of adaptation. I propose here a conceptual framework to explain how TSD curves could be adjusted by means of natural selection, based on Fisher's equilibrium sex-ratio principle. Through a process that alternatively favors mothers that tend to produce the rare sex under new temperatures, sex ratios eventually return toward a theoretical equilibrium. Prerequisites for this model are variability among mothers in the tendency to produce a particular sex at a given temperature (i.e., variability in the thermal reaction norm), inheritance of this trend, and higher fitness of the rare sex. This straightforward mechanism could facilitate thermal adaptation in species with TSD over multiple generations.

Keywords: adaptive significance, feminization, fisher's principle, natural selection, sea turtles, thermal reaction norms, TSD curves