Table S1. References for thermal performance curves (TPCs) and acute heat tolerance measures presented in main text Fig. 1.

Species	**Trait/data type**	**Details**	**Data source**
Drosophila melanogaster	Growth	Growth rate before eclosion	**Frazier, M. R., Woods, H. A. and Harrison, J. F.** (2001). Interactive effects of rearing temperature and oxygen on the development of *Drosophila melanogaster*. *Physiol. Biochem. Zool.* **74**, 641–650.
	Fitness proxy	Product of fecundity, developmental speed and developmental success	**Overgaard, J., Kearney, M. R. and Hoffmann, A. A.** (2014). Sensitivity to thermal extremes in Australian *Drosophila* implies similar impacts of climate change on the distribution of widespread and tropical species. *Glob. Chang. Biol.* **20**, 1738–1750.
	Speed	Running speed	**Soto-Padilla, A., Ruijsink, R., Sibon, O. C. M., van Rijn, H. and Billeter, J.-C.** (2018). Thermosensory perception regulates speed of movement in response to temperature changes in *Drosophila melanogaster*. *J. Exp. Biol.* jeb.174151.
	SMR	Standard metabolic rate	**Bozinovic, F., Catalan, T. P., Estay, S. A. and Sabat, P.** (2013). Acclimation to daily thermal variability drives the metabolic performance curve. *Evol. Ecol. Res.* **15**, 579–587.
	TDT	Heat knockdown time in exposure to constant temperature	**Jørgensen, L. B., Malte, H. and Overgaard, J.** (2019). How to assess *Drosophila* heat tolerance: Unifying static and dynamic tolerance assays to predict heat distribution limits. *Funct. Ecol.* **33**, 629–642.
	CT_{max}	CT_{max} measured in dynamic assays using various ramping rates	**Chown, S. L., Jumbam, K. R., Sørensen, J. G. and Terblanche, J. S.** (2009). Phenotypic variance, plasticity and heritability estimates of critical thermal limits depend on methodological context. *Funct. Ecol.* **23**, 133–140. **Hangartner, S. and Hoffmann, A. A.** (2016). Evolutionary potential of multiple measures of upper thermal tolerance in *Drosophila melanogaster*. *Funct. Ecol.* **30**, 442–452. **Jørgensen, L. B., Malte, H. and Overgaard, J.** (2019). How to assess *Drosophila* heat tolerance: Unifying static and dynamic tolerance assays to predict heat distribution limits. *Funct. Ecol.* **33**, 629–642. **Manenti, T., Cunha, T. R., Sørensen, J. G. and Loeschcke, V.** (2018). How much starvation, desiccation and oxygen depletion can *Drosophila melanogaster* tolerate before its upper thermal limits are affected? *J. Insect Physiol.* **111**, 1–7.

Salvelinus fontinalis	Growth	Growth rate	**McCormick, J. H., Hokanson, K. E. F. and Jones, B. R.** (1972). Effects of Temperature on Growth and Survival of Young Brook Trout, *Salvelinus fontinalis*. *J. Fish. Res. Board Canada* **29**, 1107–1112.
	Fitness proxy	Viable eggs per female	**Hokanson, K. E. F., McCormick, J. H., Jones, B. R. and Tucker, J. H.** (1973). Thermal Requirements for Maturation, Spawning, and Embryo Survival of the Brook Trout, *Salvelinus fontinalis*. *J. Fish. Res. Board Canada* **30**, 975–984.
	Speed	Cruising swim speed	**Graham, J. M.** (1949). Some effects of temperature and oxygen pressure on the metabolism and activity of the speckled trout, *Salvelinus fontinalis*. *Can. J. Res.* **27d**, 270–288.
	SMR	Standard metabolic rate	**Durhack, T. C., Mochnacz, N. J., Macnaughton, C. J., Enders, E. C. and Treberg, J. R.** (2021). Life through a wider scope: Brook Trout (*Salvelinus fontinalis*) exhibit similar aerobic scope across a broad temperature range. *J. Therm. Biol.* **99**, 102929.
	TDT	Heat knockdown time in exposure to constant temperature	**Brett, J. R.** (1956). Some Principles in the Thermal Requirements of Fishes. *Q. Rev. Biol.* **31**, 75–87.
	CT_{max}	CT_{max} measured in dynamic assays using various ramping rates	**Carline, R. F. and Machung, J. F.** (2001). Critical Thermal Maxima of Wild and Domestic Strains of Trout. *Trans. Am. Fish. Soc.* **130**, 1211–1216. **Galbreath, P. F., Adams, N. D. and Martin, T. H.** (2004). Influence of heating rate on measurement of time to thermal maximum in trout. *Aquaculture* **241**, 587–599. **Lee, R. M. and Rinne, J. N.** (1980). Critical thermal maxima of five trout species in the Southwestern United States. *Trans. Am. Fish. Soc.* **109**, 632–635. **Morrison, S. M., Mackey, T. E., Durhack, T., Jeffrey, J. D., Wiens, L. M., Mochnacz, N. J., Hasler, C. T., Enders, E. C., Treberg, J. R. and Jeffries, K. M.** (2020). Sub-lethal temperature thresholds indicate acclimation and physiological limits in brook trout *Salvelinus fontinalis*. *J. Fish Biol.* **97**, 583–587. **Shaughnessy, C. A. and McCormick, S. D.** (2018). Reduced thermal tolerance during salinity acclimation in brook trout (*Salvelinus fontinalis*) can be rescued by prior treatment with cortisol. *J. Exp. Biol.* **221**, jeb169557.

Dreissena polymorpha	Growth	Shell-length growth	**Churchill, C. J., Hoeinghaus, D. J. and La Point, T. W.** (2017). Environmental conditions increase growth rates and mortality of zebra mussels (*Dreissena polymorpha*) along the southern invasion front in North America. *Biol. Invasions* **19**, 2355–2373.
	Attachment	Attachment strength	**Kobak, J.** (2006). Factors influencing the attachment strength of *Dreissena polymorpha* (Bivalvia). *Biofouling* **22**, 141–150.
	Filtration	Gill filtration rate	**Lei, J., Payne, B. S. and Wang, S. Y.** (1996). Filtration dynamics of the zebra mussel, *Dreissena polymorpha*. *Can. J. Fish. Aquat. Sci.* **53**, 29–37.
	SMR	Standard metabolic rate	**Alexander, J. E. and McMahon, R. F.** (2004). Respiratory response to temperature and hypoxia in the zebra mussel *Dreissena polymorpha*. *Comp. Biochem. Physiol. - A Mol. Integr. Physiol.* **137**, 425–434.
	TDT	Heat knockdown time in exposure to constant temperature	**McMahon, R. F., Matthews, M. A., Ussery, T. A., Chase, R. and Clarke, M.** (1995). *Further studies of heat tolerance of zebra mussels: effects of temperature acclimation and chronic exposure to lethal temperatures*. Technical Report EL-95-9, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
	CT_{max}	CT_{max} measured in dynamic assays using various ramping rates	**McMahon, R. F. and Ussery, T. A.** (1995). *Thermal tolerance of zebra mussels (Dreissena polymorpha) relative to rate of temperature increase and acclimation temperature*. Technical Report EL-95-10, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Table S2. References for thermal death time (TDT) curves presented in main text **Fig. 2**.

Species	Data source
Daphnia magna	**Kivivuori, L. A. and Lahdes, E. O.** (1996). How to measure the thermal death of *Daphnia*? A comparison of different heat tests and effects of heat injury. *J. Therm. Biol.* **21**, 305–311.
Dreissena polymorpha	**McMahon, R. F., Matthews, M. A., Ussery, T. A., Chase, R. and Clarke, M.** (1995). *Further studies of heat tolerance of zebra mussels: effects of temperature acclimation and chronic exposure to lethal temperatures*. Technical Report EL-95-9, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
Drosophila melanogaster	**Jørgensen, L. B., Malte, H. and Overgaard, J.** (2019). How to assess *Drosophila* heat tolerance: Unifying static and dynamic tolerance assays to predict heat distribution limits. *Funct. Ecol.* **33**, 629–642.
Drosophila subobscura	**Hollingsworth, M. J.** (1969). Temperature and length of life in *Drosophila*. *Exp. Gerontol.* **4**, 49–55.
Lepomis macrochirus	**Hart, J. S.** (1952). *Geographic Variations of Some Physiological and Morphological Characters in Certain Freshwater Fish*. University of Toronto Press.
Micropterus salmoides	**Hart, J. S.** (1952). *Geographic Variations of Some Physiological and Morphological Characters in Certain Freshwater Fish*. University of Toronto Press.
Mytilus edulis	**Wallis, R. L.** (1975). Thermal Tolerance of *Mytilus edulis* of Eastern Australia. *Mar. Biol.* **30**, 183–191.
Oncorhynchus tshawystcha	**Coutant, C. C.** (1970). *Thermal resistance of adult coho (*Oncorhynchus kisutch*) and jack chinook (*O. tshawyscha*) salmon, and adult steelhead trout (*Salmo gairdneri*) from the Columbia River*. No. BNWL-1508, Battelle-Northwest, Richland, WA (United States).