*Table S1. Statistical output from the linear mixed model, modelling effects of population (Reference and Biotest) and assay temperature (16, 23, 30, 32.5 and 36ºC) on enzyme catalytic capacities.*

| | Fixed effects ($\chi$ 2) | | | Random effects (S.D.) | | |
|---|---|---|---|---|---|---|
| | Assay temperature | Population | Population x Assay emperature | Fish sampled | Assay temperature within fish sampled | Residual |
| Numerator (df) | 4§ | 1§ | 4§ | | | |
| PK | 635.57*** | 0.077 | 7.07 | 0.13 | 0.36 | 0.13 |
| LDH | 208.14*** | 13.85*** | 2.94 | 0.85 | 0.46 | 0.23 |
| PDH | 210.48*** | 6.81** | 15.95** | $2.56\times10^{-4}$ | $1.06\times10^{-4}$ | $5.73\times10^{-5}$ |
| CS | 3074.82*** | 25.56*** | 68.06*** | 0.94 | 0.67 | 0.31 |
| MDH | 562.90*** | 35.84*** | 6.85 | 0.57 | 0.26 | 0.14 |
| AAT | 1046.40*** | 35.00*** | 39.56*** | 0.042 | 0.031 | 0.014 |
| HOAD | 206.32*** | 1.07 | 57.77*** | $6.90\times10^{-3}$ | $6.04\times10^{-3}$ | $2.68\times10^{-3}$ |
| CI | 49.19*** | 17.04*** | 17.51** | $1.19\times10^{-3}$ | $9.65\times10^{-4}$ | $4.35\times10^{-4}$ |
| CI+CIII | 185.24*** | 0.60 | 9.05 | 0.10 | 0.05 | 0.03 |
| CIV | 133.53*** | 0.42 | 33.44*** | 0.04 | 0.02 | 0.01 |

*Chi-square values are reported, and p values based on a Type II ANOVA, with * indicating significance at p <0.05, ** at p < 0.01, and *** at p < 0.001. For the random effects, values of S.D. are given for fish sampled, assay temperature within fish sampled and Residual.*
*§ df for AAT are 3, 1 and 3 for Assay temperature, Population and Population × Assay temperature respectively.*

Table S2. A comparison of cardiac enzymatic activities in the current study and previously reported values in various teleost fishes.

| Study | Species | | Assay temperature (°C) | PK | LDH | PDH | CS | MDH | AAT | HOAD | CI | CI+CIII | CIV |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Current study | European perch, *Perca fluviatilis* | Reference | 16[a] | 18 | 128 | 0.084 | 8.0 | 168 | 9.1 | 1.3 | 0.25 | 12.4 | 3.2 |
| | | Biotest | 23[a] | 20 | 131 | 0.09 | 15.6 | 180 | 8.2 | 1.5 | 0.26 | 17.9 | 3.6 |
| Swimmer et al. (2004) | Bigeye, Yellowfin and Skipjack tuna[1] | | 17 | ~50-60 | ~230-300 | | ~35-50 | | | | | | |
| West et al. (1999) | Amazonian fish species[2] | | 22-25 | 49.6 | 296 | | 17.4 | | | 6.8 | | | 24.6 |
| | Temperate fish species[3] | | | 94.5 | 427 | | 31.4 | | | 10.3 | | | 50.5 |
| Sidell et al (1987) | Eleven marine and freshwater species[4] | | 15 | ~18-69 | ~112-330 | | ~4-18 | | | 1.4-10 | | | ~13-50 |
| Sephton and Driedzic (1991) | White perch, Yellow perch and Smallmouth bass[5] | | 5 | | | | 3.0-12.3 | | | | | | |
| | | | 20 | | | | 5.2-26.2 | | | | | | |
| Driedzic and Stewart (1982) | Sea raven, *Hemitripterus americanus* | | | 36 | 41[b] | | 12.5 | 145 | | 1.8 | | | 36 |
| | Ocean pout, *Macrozoarces americanus* | | | 37 | 58[b] | | 12.8 | 226 | | 2.9 | | | 30 |
| Feller and Gerday, (1987) | Unicorn icefish, *Channichtys rhinoceratus* | | 10 | | 437 | | 8.53 | | | | | | 6.01 |
| | Magellanic rockcod, *Paranotothenia magellanica* | | | | 68 | | 11.32 | | | | | | 8.90 |
| Srivastava et al., (1999) | Rohu, *Labeo rohita* | | 25 | | | | | | 5.8-15.4[c] | | | | |
| | | | | | | | | | 0.25-0.65[d] | | | | |
| Cai and Adelman, (1990) | Common carp, *Cyprinus carpio* | | 30 | | | | | | | | | | ~0.2 |
| Goolish and Adelman, (1987) | Largemouth Bass, *Micropterus salmoides* | | 22 | | | | | | | | | | ~1.4-3.5 |
| Speers-Roesch et al. (2010) | Tilapia, *Oreochromis* hybrid sp. | | 22 | | | ~0.28-0.82 | | | | | | | |

All values are reported means and enzymatic activity expressed as U. $g^{-1}$ of tissue.
[a] Also representing the acclimation temperatures for each population, [b] 0.33mM pyruvate was used to initiate reaction, [c] Cytosolic AAT, [d] Mitochondrial AAT.
[1] *Thunnus obesus, Thunnus albacares and Katsuwonus pelamis* respectively.
[2] The oscar (*Astronotus ocellatus*), Leopard pleco (*Lipossarcus pardalis*), Tambaqui (*Colossoma macropomum*), The tambaqui (*Hoplosternum littorale*), and Arapaima (*Arapaima gigas*).
[3] Rainbow trout (*Oncorhynchus mykiss*), Yellow perch (*Perca flavescens*), American eel (*Anguilla rostrata*), Brown bullhead (*Ictalurus punctatus*).
[4] Ocean pout, *Macrozoarces americanus, Sea raven, Hemitripterus americanus, Anglerfish, Lophius piscatorius, Three-breaded rockling, Gaidropsarus vulgaris, Atlantic cod, Gadus morhua, Common carp, Cyprinius caprio, White perch, Morone americanus, Chain pickerel Esox niger, Striped bass, Norone saxatilis, Sea bass, Dicenrarchus labrax, Atlantic mackerel, Scomber scombrus.*
[5] *Morone Americana*; *Perca flavescens* and *Micropterus dolomieiu* respectively.

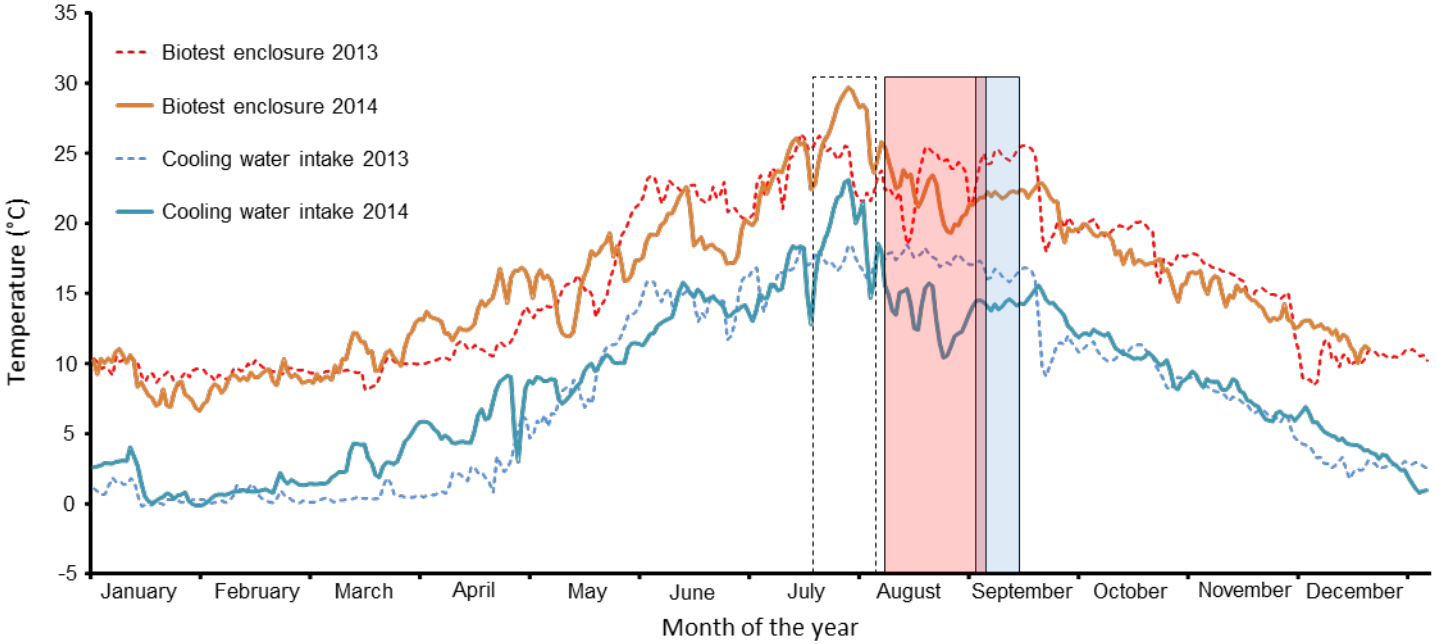


***Fig. S1. Temperature profiles for the cooling water intake channel (i.e. Reference) and biotest enclosure at the perch sampling sites in previous (2013) and the current study (2014).*** *The sampling in 2013 (marked in red) took place in August while the sampling for the current experiments took place during the first week of September (marked in blue). The dashed box indicates the period in 2014 when a pronounced heat wave dramatically increased the temperature at both sites.*