

Fish specialize their metabolic performance to maximize bioenergetic efficiency in their local environment

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Species-specific ecological traits in fishes are likely to vary between populations or stocks due to differences in regional oceanic conditions, such as latitudinal temperature. We examined potential intraspecific differences in the swimming performance and metabolism of chub mackerel (*Scomber japonicus*) from the Northwest and Northeast stocks, which are distributed on opposite sides of the North Pacific at similar latitudes, but where the temperature contrast is large. Swimming bioenergetics and metabolic data of Northwest stock were measured at 14°C, 18°C, and 24°C using variable-speed swim-tunnel respirometers, and then the resulting bioenergetic parameters were compared with previous findings from the Northeast stock. At a given size, the maximum sustainable swimming speed (U_{max}) of the Northwest stock showed no significant difference compared to the Northeast stock at 18°C and 24°C, but was lower at 14°C. In addition, the oxygen consumption rate (M_{O_2}) of the Northwest stock showed lower mass dependence and different temperature dependence at a given swimming speed than in the Northeast stock. Combined with stock-specific data on growth and experienced temperatures in the wild, these bioenergetic differences indicate that the swimming performance and metabolism of the two stocks are specific to their local environment to maximize bioenergetic efficiency. This study has been already published on *Frontiers in Marine Science* (doi:10.3389/fmars.2021.613965).

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