Correlates of red throat coloration in female stickleback and their potential evolutionary significance

Lengxob Yong1*, Ruqing Guo1,2*, Daniel S. Wright1, Samantha A. Mears1, Michele Pierotti1 and Jeffrey S. McKinnon1

1Department of Biology and Center for Biodiversity, East Carolina University, Greenville, North Carolina, USA and 2Department of Biology, Nanjing University, Nanjing, Jiangsu, China

ABSTRACT

Background: In two stream-resident populations of threespine stickleback (Gasterosteus aculeatus), females often exhibit male-typical red throat coloration. These fish inhabit the Little Campbell River (British Columbia) and Matadero Creek (California). An anadromous population that lacks such coloration also inhabits the Little Campbell River. Anadromous character states are usually considered ancestral in this system. Theory suggests that ornaments such as red throat coloration can be favoured in some social contexts if they convey information about individual quality. Correlations with a second carotenoid-based ornament, red pelvic spine coloration, may also affect the information conveyed by throat colour.

Question: Within and between populations, how is red throat coloration in females associated with the quality/fitness-related traits condition, body size, age, and growth, and with red pelvic spine coloration?

Methods: In 2010–2012, we measured female throat coloration and evaluated its relationships with condition, body size, age, growth, and pelvic spine coloration.

Results: Throat red intensity was positively correlated with body size in both stream-resident populations. Analyses of one stream population suggest the most intensely red females grow fastest, but older individuals also exhibit more intense throat coloration. We did not observe correlations between throat red intensity and body condition. Red spine coloration was often positively correlated with both throat colour and body size within stream populations. In contrast, the transition from putatively ancestral anadromous character states to derived stream-resident states involved a reduction in spine red intensity, but an increase in throat coloration.

Keywords: colour, condition dependence, female ornament, Gasterosteus aculeatus, natural selection, sexual selection, threespine stickleback.

*These authors contributed equally to this work.

Correspondence: J.S. McKinnon, Department of Biology and Center for Biodiversity, East Carolina University, Greenville, NC 27858, USA. e-mail: mckinnonj@ecu.edu

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