2-1-2013

Sensory Exploitation And Indicator Models May Explain Red Pelvic Spines In The Brook Stickleback, Culaea Inconstans

Andrew Hodgson

A. Ross Black
Eastern Washington University, rblack@ewu.edu

Ryan Hull

Evolutionary Ecology Research, 2013, **15**: 199–211

Sensory exploitation and indicator models may explain red pelvic spines in the brook stickleback, *Culaea inconstans*

Andrew Hodgson, A.R. Black and Ryan Hull

Department of Biology, Eastern Washington University, Cheney, Washington, USA

ABSTRACT

Background: Sensory bias models explaining the evolution of sexually selected traits predict that trait preferences evolve as an artifact of a pre-existing preference for certain components of the environment such as specifically coloured prey. Indicator models, in contrast, predict that sexually selected traits indicate mate condition. We investigate the potential for sensory exploitation and condition indication models to explain the evolution of what appears to be a recently evolved sexually selected trait.

Question: Did red pelvic spine coloration in male Turnbull National Wildlife Refuge (TNWR) brook stickleback (*Culaea inconstans*) evolve to exploit a pre-existing sensory bias for red prey, thus helping males draw females to the nest? Or, did it evolve as an intersexual signal indicating male condition to females?

Methods: We recorded the frequency of red pelvic spine coloration in males versus females and in breeding versus non-breeding males. We measured the condition factor of males with and without red coloration on their pelvic spines. We presented fish with a paired choice between a red versus an orange, yellow, green, blue, or purple bead, and recorded the proportion of bites at each colour.

Results: Red coloration was significantly more common in males than in females and in males during the breeding season than outside the breeding season. Males with strongly red pelvic spines have a significantly higher mean condition factor than those with plain spines. TNWR brook stickleback prefer red to other colours in a predation context.

Conclusions: Our results suggest that TNWR brook stickleback red pelvic spine coloration is a secondary sexual character that may exploit a pre-existing sensory bias for red prey while also indicating condition to females.

Keywords: brook stickleback, *Culaea inconstans*, prey selection, sensory bias, sensory exploitation, sexual selection.

Correspondence: A. Hodgson, Department of Biology, 258 SCI, Eastern Washington University, Cheney, WA 99004, USA. e-mail: noonemaycomehere@gmail.com

www.evolutionary-ecology.com

***Evolutionary Ecology Research* is delighted that you wish to consult one of its articles.**

You may if your library or laboratory subscribes.

Did you know that EER invented the idea of posting final drafts of mss as soon as they are accepted?

Ask your librarian or library committee why your place does not already subscribe to the low-cost journal that is publishing splendid science in a socially responsible manner. *EER*'s low prices have helped librarians to rein in the indefensible cost increases that have reduced our access to science all over the world! Just ask our partners at ***SPARC*** — the Scholarly Publishing & Academic Resources Coalition of the Association of Research Libraries.

Or maybe you should just remind the folks who order your journals to contact us and subscribe! You need — and they should support — the journal that:

- Was the first journal in the world to allow e-only subscriptions while maintaining a traditional print edition, too.
- Vests the copyrights of all articles in their authors while preserving the rights of educational and research groups to use its material in classes, seminars, etc. at **no additional cost**.
- Maintains a unified data-base of articles so you can use your web browser to find any article, author, title word or keyword in any article that *EER* has ever published. (Forget about issue numbers, author order, and other such impediments to easy access.)
- Provides *Webglimpse* so that you can search any word, place, species, variable, phrase, keyword or author in any article *EER* has ever published.
- Provides its own **new** search filter that allows you instantly to compile a hot-linked list of articles according to year, issue, author, title word or keyword (as you prefer).

EER is the place to go for great science, responsible publication policies and easy access!

Click here for the Table of Contents of the most recent issue of *Evolutionary Ecology Research*

Click here for full access to a sample issue of *Evolutionary Ecology Research*

Click here for SUBSCRIPTION INFORMATION