

Sticklebacks: Remarkable Evolutionary Engines

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1999-2004

In June 1999 Vancouver, British Columbia, was the host city to the third International Conference on Stickleback Behaviour and Evolution, which is held every five years. This Conference attracted a broad array of scientists from all over the world who enthusiastically presented papers on different aspects of stickleback research. Vancouver was an ideal location for the Conference, since the sticklebacks of B.C. are famous.

Marine Stickleback



The stickleback is abundant in coastal waters throughout the northern hemisphere, and has fascinated scientists since it was first formally described by Linnaeus in 1758. Researchers have used the stickleback as a model organism for studying a diverse series of topics including: mate choice and courtship; learning and cognition; evolution and speciation and, more recently, environmental monitoring, genetics and gene mapping.

Species pair from Enos Lake, B.C. The larger benthic form is a specialized bottom feeder, while the slender limnetic form forages on drifting zooplankton.

[credit: Brent Cooke]

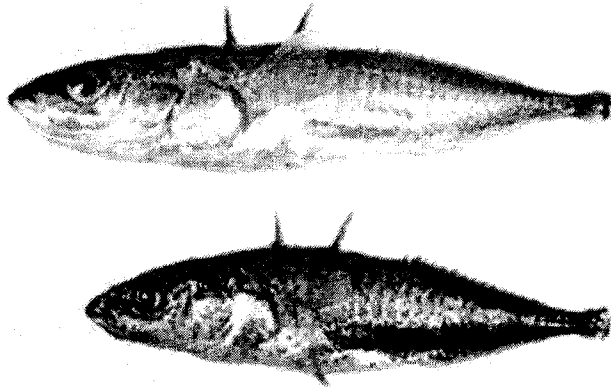
B.C. in particular, with its recently glaciated freshwater and complex marine environments, has created an incredibly diverse stickleback population. At least four life history profiles have been outlined for the Threespined Stickleback in B.C., with each profile being finely tuned to the aquatic ecosystem in which the Threespined Stickleback is



found. The variations in stickleback populations throughout the Georgia Basin, Northern Vancouver Island and the Queen Charlotte Islands have received international academic acclaim, and these fish have been compared to the Galapagos Finches of Darwinian fame.

Female marine Threespined Sticklebacks are usually larger than their male counterparts, who develop crimson throats and lapis lazuli-coloured eyes during the breeding season. [credit: Brent Cooke]

Sticklebacks seem to defy classic rules of slow and gradual evolution by having the ability to differentiate into distinct forms (sister species) very quickly -- providing an elegant, and replicated, study tool for researchers interested in the process of species evolution. Sadly, the international rules of conservation require clear taxonomic separation based on scientific evidence before any conservation measures can be undertaken. Unique sister-pair populations can suffer extinction from the introduction of non-native fish species without any serious recourse, as has been the case at Hadley Lake on Lasquiti Island, B.C.



Giant black freshwater sticklebacks are unique to dark water lakes of the Queen Charlotte Islands and Northern Vancouver Island. [credit: Brent Cooke]

Of all the fascinating papers presented at the Conference, the one I found most intriguing focussed on the fact that an increasing number of studies have linked the appearance of reproductive disorders in wildlife species to exposures to environmental contaminants that mimic sex hormones. Sticklebacks were proposed as a sentinel in the monitoring of such contaminants. They are a natural choice because they are easily handled and reared in the laboratory, globally comparable and present in our backyard.



Who knows what topics will be addressed at the next International Conference on Stickleback Behaviour and Evolution: a lot of research can be done in five short years. One thing is certain though, the topics will probably continue to focus on how well these remarkable evolutionary engines mirror the waters around them.

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