Genetic variation in the primary sex ratio in populations of the intertidal copepod, *Tigriopus californicus*, is widespread on Vancouver Island

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ABSTRACT

Hypothesis: Genetic variation for the primary sex ratio is widespread in a copepod with polygenic sex determination. Cytoplasmic sex ratio distorters (e.g. *Wolbachia* and microsporidians) influence the primary sex ratio in this copepod.

Organism: The intertidal copepod, *Tigriopus californicus*; six populations from Vancouver Island, British Columbia.

Study site: Quantitative genetics experiment in the laboratory. PCR and antibiotics experiment to test for the presence of cytoplasmic sex ratio distorters.

Results: Genetic variation for the primary sex ratio was found in five of the six populations surveyed. The primary sex ratio was paternally transmitted. There was no evidence that *Wolbachia* or microsporidians influenced the primary sex ratio of *T. californicus*.

Keywords: copepod, cytoplasmic feminizers, cytoplasmic sex ratio distorters, heritability, microsporidia, polygenic sex determination, primary sex ratio, Rifampin, *Tigriopus californicus*, *Wolbachia*.

INTRODUCTION

Adaptive sex ratio theory in sexually reproducing animals explains how individuals should allocate their limited resources to the production of male or female offspring. Fisher (1930) pointed out that the best strategy is to invest equally in both because, on average, sons and daughters each supply half of the genes to the next generation. If the costs of producing sons and daughters are the same, Fisher (1930) predicted that at equilibrium, the sex ratio in the population would be 1 : 1. Two important points to understand about Fisher’s sex ratio theory are that (1) it makes predictions about the primary sex ratio, defined here as the
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