Mate-choice copying in free-ranging Trinidadian guppies (*Poecilia reticulata*)

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Summary

The social experiences of individuals can influence their mate-choice decisions. Mate-choice copying is considered to have occurred if an individual's observation of a sexual interaction between a male and a female increases its likelihood of subsequently preferring the individual observed mating. Although such copying behaviour has been documented extensively in the laboratory, there exists only very limited evidence for its occurrence in nature. Here, we experimentally investigated female mate-choice copying in a wild Trinidadian population of the guppy (*Poecilia reticulata*), a species that exhibits such copying behaviour in the laboratory. Using a pair of Plexiglas tanks placed in situ in a river in Trinidad, we presented free-ranging adult females with a binary choice of viewing and affiliating with either of two similar-sized stimulus males: one male was viewed next to a visible model (demonstrator) female and the other male viewed apparently alone (placed next to a pseudo-model female hidden from the subject females). Focal subject females preferred to associate with the stimulus male that was near and consorting with a model female than with the lone stimulus male. The results of a separate control experiment suggest that this observed female preference was sexual in nature rather than a simple shoaling response. We conclude that our results are consistent with mate-choice copying behaviour and suggest that female guppies can mate-choice copy in the wild when given the opportunity, as they do under laboratory conditions.

Keywords: Sexual selection, mate choice, mate-choice copying, fish, guppy, *Poecilia reticulata*.

Introduction

Most evolutionary models of sexual selection generally assume that individual mating preferences are genetically based and inherited, and that individ-

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uals choose mates independently of each other (Andersson, 1994). However, the social experiences of individuals can influence their mate-choice decisions, resulting in non-independent mate choice (Gibson & Höglund, 1992; Galef Jr. & White, 2000; Westneat et al., 2000; Witte, 2006). Because mating is often a social phenomenon in vertebrates, public information (sensu Danchin et al., 2004) associated with mating activities is readily available. Individuals can, thus, acquire public (social) information from conspecifics about potential mates that can subsequently influence their mating decisions.

Mate-choice copying is a socially-mediated mate choice strategy and a form of non-independent mate choice resulting from social learning, in which an individual gains information about potential mates by observing the courtship and mating behaviours of nearby conspecifics (Gibson & Höglund, 1992; Galef Jr. & White, 2000; Westneat et al., 2000; Witte, 2006). Copying is considered to have occurred if an individual's observation of a sexual interaction between a male and a female increases its likelihood of subsequently preferring that particular male (or female) as a mate.

Most common, and of particular interest here, is conspecific female mate-choice copying, although male copying and heterospecific copying also occur in some species (e.g., Schlupp et al., 1994; Heubel et al., 2008). Most of the empirical evidence for conspecific female mate-choice copying in animals comes from studies on polygynous species (primarily fishes and birds) with internal fertilization and lack of parental care (reviewed by Gibson & Höglund, 1992; Brooks, 1998; Galef Jr. & White, 2000; Westneat et al., 2000; Witte, 2006). Some of this work shows that a female's copied preference for a particular male can be repeated and generalized to other males that share his distinctive phenotypic traits (White & Galef Jr., 2000; Witte & Noltemeier, 2002; Godin et al., 2005), be retained for extended periods (Witte & Noltemeier, 2002; Witte & Massmann, 2003; Godin et al., 2005), be transmitted among individuals within groups (Dugatkin et al., 2002), and can override genetically determined mating preferences (Dugatkin, 1996; Witte & Noltemeier, 2002). These characteristic features of mate-choice copying behaviour support theoretical models (Kirkpatrick & Dugatkin, 1994; Laland, 1994) of the potential contributions of copying to the cultural evolution of female mating preferences. Other theoretical studies have demonstrated that mate-choice copying, as an alternative mating strategy, can invade and evolve in a population under certain conditions (Wade & Pruett-Jones, 1990; Servedio & Kirkpatrick, 1996; Stöhr, 1998; Brennan et al., 2008).