

Behavioral evidence of chemical communication by male caudal fin organs of a glandulocaudine fish (Teleostei: Characidae)

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All fishes in the tribe Glandulocaudini have hypertrophied tissue with club cells in the caudal fin (the caudal organ). Because this structure is present only in adult males, it is hypothesized that these cells secrete a reproduction-related pheromone. The hypothesis that the caudal organ releases chemicals that attract females is tested in *Mimagoniates inequalis*. In a Y-maze and an aquarium, females were attracted to a caudal organ extract and to water that was conditioned with caudal organ-bearing males, respectively, but not to caudal-fin lobe extract or water conditioned with males from which the caudal organs were removed (control stimuli). In tests with male-female pairs, there were no differences in the responses to caudal organ extract and male caudal organ-conditioned water, but the responses to both stimuli differed in relation to the controls. Male-female pairs engaged in fewer courtship events and more agonistic interactions than they did without chemical stimuli and with control stimuli. These results provide evidence for a possible pheromonal system in *M. inequalis*. The caudal organ is a specialized secretory structure that produces a chemical signal that attracts females and increases the aggressiveness of males.

Introduction

The ability of animals to obtain information about their physical and social environment is essential for their survival and reproductive success (Ward et al., 2007). In the last case, intersexual communication to attract, locate or assess the quality of potential reproductive partners may involve visual, tactile, auditory, and chemical signals (Gaskett, 2007).

Fishes of the teleost cohort Otomorpha (Betancur-R et al., 2017), that comprise seven orders, are mostly oviparous and externally fertilizing strategists. However, in some species of Characi-

formes (Kutaygil, 1959; Nelson, 1964a; Burns et al., 1995, 1997, 2000; Malabarba, 1998; Weitzman & Menezes, 1998; Castro et al., 2003; Weitzman et al., 2005; Javonillo et al., 2009; Quagio-Grassiotto et al., 2012) and Siluriformes (von Ihering, 1937; Loir et al., 1989; Burns et al., 2000; Meisner et al., 2000; Spadella et al., 2008, 2012; Javonillo et al., 2009) sperm has been reported in the ovaries, along with unfertilized eggs, and therefore the term insemination has been used to characterize the strategy adopted by these fishes (Burns et al., 1995, 1997; Azevedo et al., 2000; Burns & Weitzman, 2005; Javonillo et al., 2009).

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