

Contextual chemosensory urine signaling in an African cichlid fish

By Karen P. Maruska, Department of Biology, Stanford University

RESEARCH ARTICLE SUMMARY

Chemosensory signaling is crucial for communication in many fish species, but little is known about how signalers modulate chemical output in response to sensory information and social context. Here, we tested the hypothesis that dominant male African cichlid fish (*Astatotilapia burtoni*) use urine signals during social interactions, and demonstrate that this signaling depends on social context (reproductive; territorial) and on available sensory information (visual



cues; full interaction). We injected males with dye to visualize urine pulses and exposed them to full sensory information or visual cues alone of four types: (1) dominant male; (2) gravid (reproductively receptive) females; (3) mouth-brooding (non-receptive) females; or (4) control (no fish). We found that males released urine sooner and increased their urination frequency when visually exposed to gravid females as compared with mouth-brooding females and or no-fish controls. While males could distinguish female reproductive states using visual cues alone, courtship behavior rates were ~10-fold higher when they fully interacted with gravid females compared



with receiving visual cues alone. Males also increased their urination and territorial behaviors when exposed to another male, suggesting that chemical signals may convey information on dominance status. These data support the hypothesis that dominant males use urine as a chemical signal and adjust the frequency of their urine output based on contextual information.

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