

Title:

Complex signaling in a fiddler crab species: Why do multiple signals coexist?

Abstract:

Animals in a broad range of taxonomic groups are known to use several distinct signals within a species. These signals may provide the same information that allows for an increased accuracy of receiver response (backup hypothesis); or provide different information such as species identity, sex, location, and various aspects of individual quality (multiple messages hypothesis). Backup signals are predicted to be similar in their occurrence patterns, while signals serve as multiple messages would be used in different contexts. In natural populations of the fiddler crab, *Uca lactea*, I found that males performed several types of claw-waving display. Each type of display had different tendency of the audiences and seasonal occurrence pattern, and hence these displays appeared to be used as multiple messages. Why then does this species need to employ multiple messages for their communication? I will discuss when and how required information varies, and will also talk about the types of cost to be borne. Courtship signals, for instance, should show the signaler's quality which provides direct and/or indirect benefit for the receiver, and the honesty would be ensured by strategic costs. Deterrent signals to perform the awareness of the signaler, by contrast, would merely require efficacy costs.