

Contest vs. scramble competition and androgen responsiveness of males pursuing fixed and plastic alternative reproductive tactics

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Reproductive investment and aggression patterns typically diverge between individuals pursuing alternative reproductive tactics (ARTs). Evolutionary theory predicts that the relative frequencies of alternative male genotypes in a population are stabilized by negative frequency dependence, implying that competition is greatest between males of the same type. Furthermore, ARTs have been shown to relate to diverging hormone responses, while, in parallel, observed differences in androgen responses may also be influenced by the social environment.

The cichlid *Lamprologus callipterus* exhibits three male ARTs involving an extreme intrasexual size dimorphism determined by Mendelian inheritance. Large nest males defend territories and construct nests of empty snail shells in which females breed. In contrast, the genetically fixed dwarf males do not court but enter shells surreptitiously during spawning, in order to steal fertilizations. Finally, the plastic and conditional sneaker males enter nests during spawning to steal occasional fertilizations from nest owners. In an experiment exposing males pursuing divergent ARTs to rivals of different types and competition intensities, we found the predictions of tactic specific aggression confirmed only in bourgeois nest males. In parasitic males, scramble competition selecting for a rapid response when opportunities for parasitic reproduction arise seems more appropriate and may be more likely to stabilize their tactic frequencies. Additionally, our study provides insights into the endocrine responsiveness of males pursuing fixed and plastic ARTs, showing difference between male tactics. Nest males had significantly higher 11-KT levels compared to sneaker males, but did not differ from the genetically fixed dwarf males. Dwarf males had the highest T levels of all male tactics, while nest and sneaker males had lower but similar level. We did not find that androgen levels of male tactics were influenced by different levels of competition. However, overall free T responses of nest males were significantly correlated with their aggressive behaviour.