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Abstract

Are There Differential Roles in the Parental Behaviour of the Chameleon Cichlid *Australoheros facetus*? †

Gonçalo Oliveira ‡, João L. Saraiva, Nuno F. Jesus and Pedro M. Guerreiro *

Centre of Marine Sciences (CCMAR), University of Algarve, 8005-139 Faro, Portugal; a61229@ualg.pt (G.O.); jsaraiva@ualg.pt (J.L.S.); nunofjesus@gmail.com (N.F.J.)

* Correspondence: pmgg@ualg.pt

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‡ Presenting author (Poster presentation).

Abstract: Cichlids are social fishes well known for their complex behaviour. The chameleon cichlid, *Autraloheros facetus*, is native to South American river drainages and is currently established in several Mediterranean-type drainages in southern Portugal as an invasive species. Their high local recruitment, territorially, and parental care activities are possible advantages in competing with native fish and achieving high reproductive success. The main objective of this work was to characterise the behaviours of the males and females of the species *A. facetus* upon pair formation and their roles during parental behaviour at different stages of offspring development for the purpose of gathering important basic knowledge on fish biology to apply in the control of the species' populations. To attain this initial goal, we used observation techniques and video recording protocols to characterise the specific activities performed by each individual during reproductive and parental stages (pair formation, eggs, attached larvae, and free-swimming larvae), identifying the main tasks, and assessing the time spent on each task by each member of the reproductive pair. The breeding pairs were obtained as a result of the social hierarchy formed in each social group: groups of six individuals of similar size were placed in individual tanks fitted with a bottom biological filter, in which the temperature was increased to 24 °C at an expanded photoperiod. Social behaviours were recorded and characterised, expanded on a previously established ethogram. The results obtained so far allow us to establish a set of aggressive behaviours towards other fish (striking, chasing, biting), nest preparing behaviours (digging, cleaning), caring (caring, fetching), and guarding behaviours towards the offspring (hovering, patrolling). Concerning the rate of occurrence of social behaviours in randomised 5 min periods (frequency of specific behaviours per each 5 min period) show that in the pair formation stage, males present a more aggressive nature with frequent occurrence of striking ($r_{striking}$ = 1) and biting (r_{biting} = 0.31). On the other hand, at the egg stage, the rate of occurrence of parental behaviours shows the dominance of females to prepare the nest ($r_{digging}$ = 0.91) and caring for the eggs (r_{caring} = 3.64), while males are more vigilant ($r_{parental\ hovering}$ = 0.95). At the attached larvae stage, this tendency continues with higher occurrence rates: males focus on vigilance ($r_{parental\ hovering}$ = 1.6) and patrolling ($r_{patrolling}$ = 2), and females care for the recently hatched larvae ($r_{fetching}$ = 4). Finally, at the free-swimming larvae stage, there is a turn and a small decrease in the occurrence of these activities: males oversee nest maintenance ($r_{digging}$ = 1.09), and females patrol the tank ($r_{patrolling}$ = 0.71) and care for the larvae ($r_{fetching}$ = 2.02). These preliminary data suggest differential roles for male and female *A. facetus*, that evolve during parental behaviour, for which further experimental paradigms will be designed to explore underlying proximate causes.

Keywords: ethogram; fish behaviour; fish reproduction; invasive species; video recordings

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