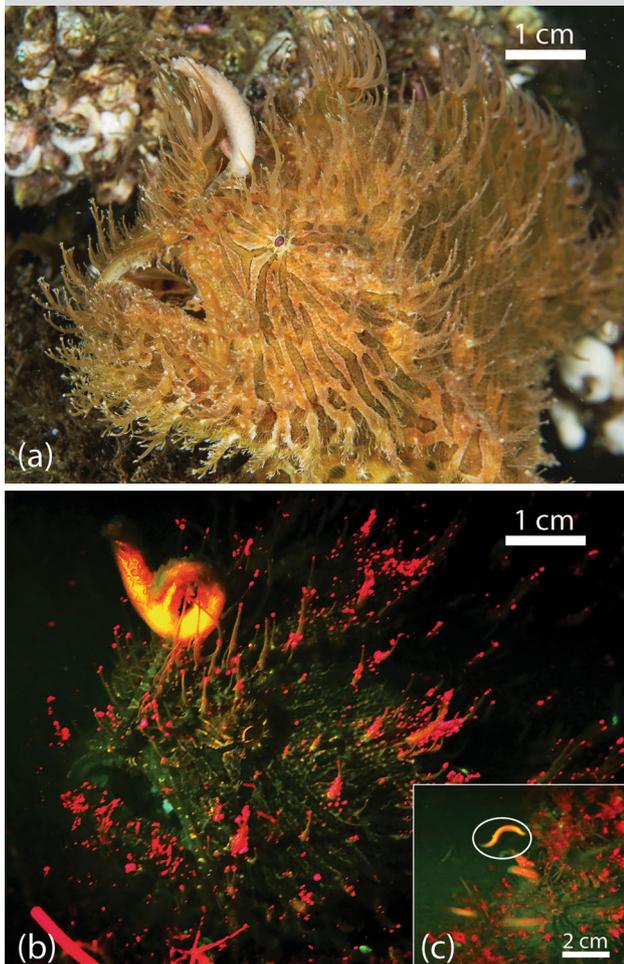


## Stars and stripes: biofluorescent lures in the striated frogfish indicate role in aggressive mimicry



**Fig. 1** *Antemarius striatus* under **a** normal light and **b** fluorescent light and **c** worm under fluorescent light

### References

- Pietsch TW, Grobecker DB (1987) Frogfishes of the world: systematics, zoogeography, and behavioral ecology. Stanford University Press, Palo Alto
- Ramaiah N, Chandramohan D (1992) Occurrence of *Photobacterium leiognathi*, as the bait organ symbiont in frogfish *Antemarius hispidus*. Indian J Geomarine Sci 21:210–211
- Sparks JS, Schelly RC, Smith WL, Davis MP, Tchernov D, Pieribone VA, Gruber DF (2014) The covert world of fish biofluorescence: a phylogenetically widespread and phenotypically variable phenomenon. PLoS One 9:e83259

**Electronic supplementary material** The online version of this article (doi:[10.1007/s00338-016-1493-1](https://doi.org/10.1007/s00338-016-1493-1)) contains supplementary material, which is available to authorized users.

M. De Brauwer  (✉) · J.-P. A. Hobbs  
 Department of Environment and Agriculture, Curtin University, Perth, WA 6485, Australia  
 e-mail: maarten.debrauwer@curtin.edu.au

Received: 12 June 2016 / Accepted: 4 August 2016 / Published online: 17 August 2016  
 © Springer-Verlag Berlin Heidelberg 2016

Coral Reefs (2016) 35:1171  
 DOI 10.1007/s00338-016-1493-1

Recent research shows biofluorescence is common in cryptic-patterned coral reef fishes (Sparks et al. 2014). The functional roles of biofluorescence are largely unknown although camouflage and covert intraspecific communication have been hypothesized (Sparks et al. 2014).

Anglerfishes (order Lophiiformes) use an adapted first dorsal spine (esca) as a lure to attract potential prey (aggressive mimicry). Some anglerfishes inhabiting the deep sea (1000 m) use bioluminescent esca to attract prey in dark waters. On coral reefs, anglerfishes are represented by frogfishes (*Antemariidae*), which are cryptic ambush predators whose species-specific esca have evolved to resemble prey such as crustaceans or worms (Pietsch and Grobecker 1987).

Here we report a frogfish (*Antemarius striatus*; Fig. 1a) with biofluorescent esca. Using high-intensity blue LED torches and yellow filters while night diving (depth 5 m) in Dauin, Philippines (9°11'11.64"N, 123°16'4.92"E), we observed three individuals whose worm-shaped esca showed bright orange fluorescence (Fig. 1b). None of the observed fish showed fluorescence on the body, except for limited red fluorescence caused by algal growth. Within 50 cm of the frogfish, we observed free-swimming worms (unidentified species) that were the same size (2 cm) as the frogfish esca and exhibited the same orange fluorescence (Fig. 1c; Electronic Supplementary Material). This suggests biofluorescent esca are used in aggressive mimicry. Bioluminescent bacteria (*Photobacterium leiognathi*) have been reported in the esca of another frogfish (*A. hispidus*) (Ramaiah and Chandramohan 1992) and may serve the same purpose.

These observations indicate a novel function (prey capture) for biofluorescence in coral reef fishes. Given that aggressive mimicry is typical of frogfishes, further research is required to confirm whether biofluorescent esca influence predation success in this genus and to determine the role of biofluorescence in the evolution of reef fishes.

**Acknowledgments** We thank Luke Gordon for assistance with surveys and daytime photography. Dauin research permits granted to MDB by municipality mayor Neil B. Credo.