BRIEF COMMUNICATION

Range extensions for three fish species at Pitcairn Island, South Pacific

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A baited videographic survey at Pitcairn Island has extended the known range for three reef fish species: blue-lined triggerfish *Xanthichthys caeruleolineatus*, greater amberjack *Seriola dumerili*, and giant trevally *Caranx ignobilis*. This highlights the importance of further research in this remote, poorly studied island group and provides evidence supplementing the understanding of oceanographic patterns in the South Pacific.

Key words: BRUVS; reef; Pitcairn; blue-lined triggerfish *Xanthichthys caeruleolineatus;* greater amberjack *Seriola dumerili*; giant trevally *Caranx ignobilis.*,

Between May and August 2014 a Baited Remote Underwater Videography System (BRUVS) survey was carried out in the coastal waters (depth range 8-33 m) of Pitcairn Island (25°04′S, 130°06′W), a UK Overseas Territory in the South Pacific. This represented the first application of the BRUVS

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sampling methodology in the Pitcairn Islands. Due to the island's remote location and inaccessibility, the associated reef fish assemblage has not been subject to long term comprehensive studies, and the use of BRUVS- established as a robust fish sampling approach (Letessier *et al.*, 2013) - is a first step toward this. Current knowledge of the Pitcairn fish assemblage is based on an initial inventory following a visit to the island in 1971 by J. Randall (Randall, 1999); a 2012 National Geographic expedition using SCUBA transects and drop cameras (Sala *et al*., 2012); and fieldwork carried out in support of a report on the biodiversity of the Pitcairn Islands (Irving & Dawson, 2012). A report describing fishing methods and containing fisheries species data of Pitcairn Island was also produced in 2012 (Göthesson, 2012).

A total of 42 BRUVS deployments were conducted, each of one hour duration, which yielded 39 valid samples. As part of the analysis of the video footage (using SEAGIS EventMeasure software), all recorded fishes were identified to species level whenever possible, with 94.5% of individual fishes successfully identified. The list of recorded species included several which had not previously been recorded within the Pitcairn fish assemblage. This brief communication provides an overview of the new species records with accompanying photographic evidence taken from the BRUVS footage.

The first recorded range extension relates to the blue-lined triggerfish *Xanthichthys caeruleolineatus* (Randall, Matsuura & Zama, 1978). *X. caeruleolineatus* is a medium-sized species of the Balistidae family, with a previous known range in tropical waters extending from St Brandon's Shoal in the western Indian Ocean, through the Coral Triangle to the Tuamotu Islands in eastern French Polynesia, with a northern extension to the Ryuku Islands (Fishbase, 2016; Randall, 2005). The record of this species from the Tuamotu Islands was previously considered the easternmost limit of its distribution.

During video analysis, a single individual of *X. caeruleolineatus* was recorded from a camera deployment on 11th June off the coast of Pitcairn Island at a depth of 30m, in the water column above a mixed habitat of foliose algae, rock and small coral heads. The distinctive markings of the species and excellent visibility during the camera deployment enabled a robust identification to be made and ensured that the species could be confirmed as separate from the other triggerfish species detected by the BRUVS sampling.

This species has not been recorded by previous marine biodiversity surveys on the other three islands of the Pitcairn Group (Henderson, Ducie & Oeno). Consequently, the authors consider that the sighting of *X. caeruleolineatus* during BRUVS sampling represents a new occurrence of the species, a first recording of the species for the whole Pitcairn Group and moreover a significant extension of the species' known range, given that the nearest previous occurrence was recorded in the Tuamotu Islands which are separated from Pitcairn Island by roughly 500 km of open ocean (Eschmeyer, 2011).

A second range extension relates to the greater ambjerjack *Seriola dumerili* (Risso, 1810).
S. dumerili is a species of the Carangidae family, with records from the Hawaiian Islands and New Caledonia indicating the limits of the species' known distribution in the Pacific Ocean (Fishbase, 2016). A single individual was recorded during a BRUVS deployment on 11th June 2014 at a depth of 20 m. The individual in question made a single pass of the camera without feeding on the bait.

This species had never previously been identified in the Pitcairn Islands, although the yellowtail amberjack *Seriola lalandi* (Valenciennes 1833) and almaco jack *Seriola rivoliana* (Valenciennes 1833) from the same genus had been recorded from the area. This sighting is therefore considered to represent a significant range extension for the species.

A third minor range extension relates to the giant trevally *Caranx ignobilis* (Forsskål 1775). *C. ignobilis* is another large carangid species distributed throughout the Indo-Pacific, with previous records from the Hawaiian and Marquesas Islands (Fishbase, 2016). Two individuals were recorded during BRUVS sampling, with one identified within the sampling period on 13th June 2014 at a depth of 10 m, passing the cameras once without feeding on the bait.

Whilst the species has been recorded elsewhere in the Pitcairn Islands, and has also been caught by local fishers offshore from Pitcairn itself, its presence has never been previously documented by scientific surveys at the island (Irving & Dawson, 2012).

The inventory of reef fishes for the Pitcairn Islands will doubtless be added to in the future as research effort increases and previously unrecorded species are noted for the first time, thereby expanding ranges for Indo-Pacific taxa still further and demonstrating the conservation importance of the island group. As the Pitcairn Islands lie at the easternmost extent of the Indo-Pacific province, the importance of these outlying records should not be undervalued, as they may prove significant in helping to determine the impact of large-scale oceanographic variations in this part of the South Pacific.

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References

- Göthesson, L-A. (2012). *Fishes of the Pitcairn Islands*.
- Irving, R.A. & Dawson, T.P. (2012). *The Marine Environment of the Pitcairn Islands*. A Report to Global Ocean Legacy, a project of the Pew Environment Group.
- Letessier, T.B., Meeuwig, J.J., Gollock, M., Groves, L.**,** Bouchet, P., Chapuis, L., Vianna, G., Kemp, K. & Koldewey, H. (2013) Assessing pelagic fish populations: The application of demersal video techniques to the mid-water environment. *Methods in Oceanography*. [Online] doi:10.1016/j.mio.2013.11.003
- Randall, J. E. (2005). *Reef and Shore Fishes of the South Pacific: New Caledonia to Tahiti and the Pitcairn Islands.* University of Hawaii Press, Honolulu.
- Sala, E., Friedlander, A. M., Ballesteros, E., Brown, E.K., Bradner, H., Caselle, J.E., Fay, M. & Turchik, A. (2012). *Pitcairn Islands Expedition Report*. National Geographic Society and Pew Environment Group.

Electronic References.

- Eschmeyer, W. N., Fricke, R., and van der Laan, R. (eds). CATALOG OF FISHES: GENERA, SPECIES, REFERENCES. Available at http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp (last accessed 29 June 2016.)
- Fishbase. (2016). [Online]. Available at www.fishbase.org/search.php last accessed 29 June 2016).
- Randall, J.E. (1999). Report on fish collections from the Pitcairn Islands. *Atoll Research Bulletin*, No. 461, 1-36. Available at www.sil.si.edu/DigitalCollections/atollresearchbulletin/issues/00461.pdf (last accessed 1 September 2016).

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- ***Figure 1. BRUV image of X. caeruleolineatus.***

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- ***Figure 2. BRUV image of S. dumerili.***

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- ***Figure 3. BRUV image of C. ignobilis.***