Zootaxa 3887 (2): 191–224
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3887.2.4
http://zoobank.org/urn:lsid:zoobank.org:pub:8763E646-75FD-42DD-B535-C4A8733160E8

The deepwater demersal ichthyofauna of the western Coral Sea

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Abstract

The highly diverse deepwater demersal ichthyofauna of the western Coral Sea was first systematically surveyed in two exploratory voyages in 1985 and 1986, and these fish assemblages have not been investigated at the same level since. Only recently have catch data and specimens, obtained from these first voyages almost 3 decades ago, been rigorously investigated and analysed. Some 393 species of fishes from 125 families were collected during the 1985 voyage which surveyed the northeastern Australian continental margin, and the Saumarez and Queensland Plateaus. A checklist of the species caught is provided. Levels of endemicity of deepwater fishes in the western Coral Sea are very high with about 50% of well-studied groups, such as sharks and rays, confined to this relatively small geographic region. A very high proportion of species caught during this voyage were either undescribed (78 species or 20%) or new Australian records (96 species or 24%) at the time of the survey. Another 68 species (17%) are the subject of further taxonomic investigation or are currently undergoing formal description. The fauna exhibits some intraregional differences in structure. Biogeographically informative fishes such as skates appear to be cryptically partitioned within the region, differing in composition to other Australian regions and those of French territories to the east. Strong depth-related partitioning of the fauna is also evident, and its structure follows zonation patterns observed across the wider Australian region. Given the high level of micro-endemicity and regional uniqueness of the fauna, there is a compelling argument for the existence of a faunal gyre in the Coral Sea. New gap-filling surveys are needed to better define the structure of this fauna and determine its distribution.

Key words: deepwater fishes, biogeography, biodiversity, Coral Sea, southwestern Pacific

Introduction

The structure, composition and distribution of Australia's marine biological resources have been the subject of considerable investigation in recent decades for regional marine planning (IMCRA, 1998), and this research has not been confined to the faunas of inshore environments. In a bioregionalisation of Australian seas based on fish distribution data sets (Last *et al*. 2005), the continental slope was subdivided into eight province-level bioregions (see Fig. 1 in Last *et al.* 2011). Two deepwater faunal provinces were identified in the Coral Sea: a northern 'Cape Province' and the 'North Eastern Province' off central Queensland (1a and 1b in Last *et al.* 2011). However, this work identified the Coral Sea as having a major knowledge gap in marine fish biodiversity in the Australian Exclusive Economic Zone and, given the paucity of biological surveys to the region, is likely to represent an even bigger knowledge gap for other marine biota. Although based on very limited data, these tropical deepwater provinces were found to be faunally distinct from those of cooler subtropical and temperate waters of the southwestern Pacific, and from comparable latitudes in the eastern Indian Ocean off western Australia. As presently defined, the 'Northeast IMCRA Province', which lies beyond the continental shelf off central Queensland, covers an area of 95,530 km^2 (Department of the Environment & Heritage 2006). It includes a long section of continental slope bordering the Great Barrier Reef, as well as deep offshore plateaus, troughs, and a small area of abyssal basin. The seabed of the 'Cape Province', which covers an area of 111,220 km^2, is largely unexplored.

Accepted by M. Davis: 15 Oct. 2014; published: 24 Nov. 2014

exists in this region, and based on data herein, our understanding of its 'true' complexity is probably conservative. A modern biodiversity survey of the region is needed to improve on existing datasets to provide a better understanding of the distribution and bathymetric partitioning of the biota and baseline data against which to assess future human impacts in these seas. Australia will soon acquire a new deepwater research platform, the newly commissioned RV *Investigator*, capable of achieving such goals. Major survey gaps within the region include the continental slopes of the Gulf of Papua and insular slopes of the central Coral Sea. Evaluating the existence, strength and structure of a faunal gyre in the Coral Sea are critical needs for understanding regional biodiversity and to assist the regional marine planning process.

Acknowledgments

Recent effort to identify and update identifications of material retained from the So6/85 and So1/86 voyages was supported by CSIRO's Wealth from Oceans Flagship (WFO) and the Australian National Environmental Research Program (NERP) Marine Biodiversity Hub. We thank managers David Smith (WFO) and Nic Bax (NERP) for supporting this project. The 1985 research voyage (Soela So6/85) was co-funded by CSIRO Marine & Atmospheric Research (then CSIRO Division of Fisheries) and the Fisheries Research and Development Corporation, FRDC (then Fishing Industry Research and Development Council, FIRDC). In particular, we thank John Stevens (former CSIRO employee) for collecting fishes and recording catch data on the second leg of So6/85. We also thank Roy Harden Jones (former Chief of CSIRO Marine and Atmospheric Research, then CSIRO Division of Fisheries, deceased) for supporting Australian marine research in the Coral Sea. Scientific staff and crew of the FRV *Soela* assisted in the collection of specimens during the So6/85 research voyage, and in particular we thank Trevor Ward (scientist-in-charge), who recognised the value of including fish specialists aboard a largely invertebrate-focused research voyage. In addition, we thank the following people for their assistance in the 1985 research voyage: Tim Davis, Grant West, Clive Stanley, Clive Liron, John Salini, Rolf Lindholm, Richard McLoughlin, Ted Wassenberg, Wade Whitelaw, Dave Rimmer and R. Stokes (CSIRO), A.J (Sandy) Bruce (NTM), and Peter Davie (QM). The authors thank the scientific staff and crew of the second CSIRO voyage to the Coral Sea (*Soela* So1/86), particularly where specimens were deposited into Australian fish collections: Martin Gomon (NMV), Helen Larson (NTM), Mark McGrouther, Sally Reader (AMS) and Stuart Hyland (Qld Fisheries). Identification of fishes collected from the So6/85 voyage occurred over several decades. We thank the many international and national scientists who have identified fishes from these voyages. Current ANFC Collection Manager, Alastair Graham (CSIRO), and former ANFC staff, Justine O'Regan, Maria Bresic and John Palmer, made provisional identifications and assisted with the acquisition and loan transfer of specimens. Thor Carter, Louise Conboy and Carlie Devine (CSIRO) photographed collection material and enhanced images. We also thank present collection managers and curators of Australian fish collections for their curatorial assistance and hospitality during visits by the authors to their institutions: Martin Gomon and Dianne Bray (NMV, Melbourne), Mark McGrouther, Amanda Hay and Sally Reader (AMS, Sydney), Jeff Johnson (QM, Brisbane), Helen Larson, Barry Russell, Gavin Dally and Michael Hammer (NTM, Darwin), and Niel Bruce and Barbara Done (MTQ, Townsville).

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