



New records of marine fishes illustrate the biogeographic importance of Christmas Island, Indian Ocean

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Abstract

Christmas Island is situated in the tropical eastern Indian Ocean on a biogeographic border where Indian and Pacific Ocean faunas meet. Detailed field studies in 2004, 2007 and 2008, of the island's fish fauna revealed 30 new records from 15 families. For six families (Dasyatidae, Chanidae, Bramidae, Mugilidae, Siganidae, Molidae) this is the first time a species has been recorded at Christmas Island. Many of the newly recorded fishes appear to have recently colonised the island, and establishing populations will be dependent on the availability of suitable habitat and conspecific mates. These new records illustrate that Christmas Island is important for range expansion because it serves as a critical stepping-stone in the dispersal of Pacific Ocean species into the Indian Ocean and vice versa. Contact between Indian and Pacific Ocean sister species has also resulted in hybridisation at Christmas Island.

Key words:

Introduction

Christmas Island (10°30' S, 105°40' E) is an isolated, oceanic island located in the tropical, eastern Indian Ocean approximately 360 km south of Java, Indonesia (Figure 1). The island lies on the Indo-Pacific biogeographic border, and appears to represent an area of secondary contact between Indian and Pacific Ocean regional faunas (Hobbs and Salmond 2008; Hobbs et al. 2009), that were once separated by land bridges in Indonesia (Sunda Shelf Barrier: Randall 1998; Rocha *et al.* 2007). Given the unique position of this island, we decided to conduct an extensive investigation of the fish fauna to identify new records that may help reveal what role the island plays in the biogeography of tropical marine fishes.

The fish fauna of Christmas Island was surveyed in February and March 2004, February 2007 and from February to November 2008. Surveys were done almost every day during fieldtrips in 2004 and 2007, and approximately every second day during the 2008 fieldtrip. Fishes were observed whilst snorkelling in shallow waters (0–5 m) and SCUBA diving in deeper waters (5–70 m). Collectively, more than 400 SCUBA dives were undertaken and involved a combination of exploratory dives to 70 m and formal underwater visual censuses (replicate 50 by 5 m transects) conducted at 5 and 20 m depth. Over 52 different sites were examined around the full extent of the island (north, south, east and west coasts). Species were only recorded where visual identification was certain. In most cases, species were photographed to confirm identification. In