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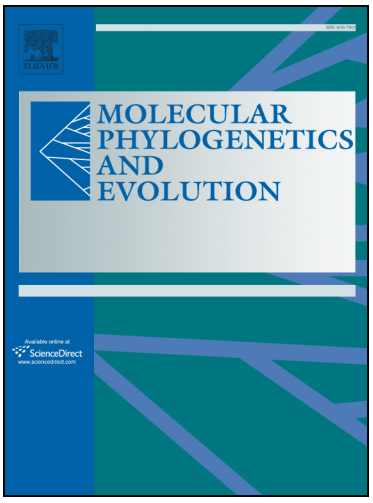

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ACCEPTED MANUSCRIPT

Flexible colour patterns obscure identification and mimicry in Indo-Pacific *Chromodoris* nudibranchs (Gastropoda: Chromodorididae)

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Abstract
Chromodoris is a genus of colourful nudibranchs that feed on sponges and is found across the Indo-Pacific. While this was once the most diverse chromodorid genus, recent work has shown that the genus should be restricted to a monophyletic lineage that contains only 22 species, all of which exhibit black pigmentation and planar spawning behaviour. Earlier phylogenies of this group are poorly resolved and thus additional work is needed to clarify species boundaries within *Chromodoris*. This study presents a maximum-likelihood phylogeny based on mitochondrial loci (COI, 16S) for 345 *Chromodoris* specimens, including data from 323 new specimens and 22 from GenBank, from across the Indo-Pacific. Species hypotheses and phylogenetic analysis uncovered 39 taxa in total containing 18 undescribed species, with only five of 39 taxa showing stable colour patterns and distinct morphotypes. This study also presents the first evidence for regional mimicry in this genus, with *C. colemani* and *C. joshi* displaying geographically-based variation in colour patterns which appear to match locally abundant congenerics, highlighting the flexibility of these colour patterns in *Chromodoris* nudibranchs. The current phylogeny contains short branch lengths, polytomies and poor support at interior nodes, which is indicative of a recent radiation. As such, future work will employ a transcriptome-based exon capture approach for resolving the phylogeny of this group. In all, this study included 21 of the 22 described species in the *Chromodoris* sensu stricto group with broad sampling coverage from across the Indo-Pacific, constituting the most comprehensive sampling of this group to date. This work highlights several cases of undocumented diversity, ultimately expanding our knowledge of species boundaries in this group, while also demonstrating the limitations of colour patterns for species identification in this genus.

1. Introduction

The Indo-Pacific harbours the greatest marine biodiversity in the world (Gosliner et al., 1996) but this area has long been under threat from climate change, overfishing, and habitat degradation (Dulvy et al., 2003). The loss of biodiversity can have significant impacts on ecosystem functioning and the recovery potential of many species (Worm et al., 2006), especially in understudied areas where the power to detect extinctions is very weak, including the Indian Ocean where despite its rich diversity it remains the most understudied ocean basin to date (Nordlund et al., 2014; Vink, 2007; Wilson and Kirkendale, 2016). Understanding the limits of species boundaries and diversity in taxa that span the Indo-Pacific is paramount for building a biodiversity baseline for this region. Species identification underpins this process but is often hindered by morphological complexities, including colour polymorphism. Colour polymorphism is widespread in marine invertebrates (e.g. Harley et al., 2006; Sokolova and

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