



A revision of the *Pyura stolonifera* species complex (Tunicata, Ascidiacea), with a description of a new species from Australia

MARC RIUS^{1,4} & PETER R. TESKE^{2,3}

¹Centre for Invasion Biology, Zoology Department, University of Cape Town, Rondebosch 7701, South Africa

²Molecular Ecology Laboratory, School of Biological Sciences, Flinders University, Adelaide, SA 5001, Australia

³Department of Zoology and Entomology, Rhodes University, Grahamstown 6140, South Africa

⁴Corresponding author. E-mail: marciusvil@gmail.com

Abstract

Pyura stolonifera is a large solitary ascidian found in Africa, Australasia and South America. The taxonomic status of different populations of this species is disputed, especially since there is evidence for several distinct morphological and genetic units that point towards the existence of multiple cryptic species. While some researchers still recognize *P. stolonifera* as a single species, others treat the different populations as distinct species. Here, we present a revision of the *P. stolonifera* species complex based on the examination of samples from all regions where there are reliable reports of this taxon. We recognize four species that are both morphologically and genetically distinct, one of which is new to science and is formally described here. This species is morphologically distinct from the other three members of the species complex in terms of the colour and texture of the tunic, the arrangement of the gonads within the gut and the shape of the dorsal tubercle, among other characters. We name the new species *Pyura dalbyi* after Dr. J.E. Dalby Jr., whose research on its ecology and distribution provided the incentive for examining this species more closely.

Key words: Pyuridae, *Pyura dalbyi* n. sp., ascidian, taxonomy, *Pyura herdmanni*, *Pyura praeputialis*, disjunct distribution, southern Africa, Chile, Morocco

Introduction

The ascidian genus *Pyura* (Suborder Stolidobranchia, Family Pyuridae) exclusively comprises solitary forms and its species can be found worldwide. One of the largest species in this genus is *Pyura stolonifera* (Heller, 1878), which forms extensive and dense aggregates that can dominate all available substrata from the mid-intertidal to the subtidal zone (Monniot & Bitar 1983; Kott 1985; Dalby 1995; Castilla *et al.* 2000; Rius *et al.* 2010). Like many other widespread ascidian species, *P. stolonifera* has a disjunct distribution that spans several continents, mostly in temperate latitudes. It is abundant in the southern hemisphere, particularly in southern Africa (where it is known as red bait) and Australia (where it is known as cunjivoi) (Kott 1985), but has also been reported in the northern hemisphere in north-west Africa (Monniot & Bitar 1983; Lafargue & Wahl 1986–1987). Recent reports from South America (Castilla *et al.* 2000) and New Zealand (Hayward & Morley 2009) suggest that the species has been introduced to these regions. The taxonomic status of the different populations is unresolved. Some researchers recognize only one species (Kott 1985; Dalby 1997a; Kott 2006), while yet others recognize more than one distinct species (Millar 1962; Monniot & Bitar 1983; Monniot *et al.* 2001; Castilla *et al.* 2002).

As *Pyura stolonifera* can be found mostly on land-masses that were part of the former Gondwanan supercontinent that split up during the Mesozoic, it has been suggested that the different populations are Gondwanan relics (Kott 1985, 2006). Notwithstanding the possibility that such an ancient origin would eventually have resulted in speciation of each of these isolated populations, Kott (2006) maintained that all are conspecifics, a claim that has been repeatedly challenged. For example, Monniot & Bitar (1983) recognized two different species (the Australasian *P. praeputialis*, Heller, 1878, and the African *P. stolonifera*) and suggested that the Chilean population had recently been introduced from Australia. Castilla *et al.* (2002) confirmed this on the basis of mitochondrial DNA