



Worming its way into Patagonia: an integrative approach reveals the cryptic invasion by *Eulalia clavigera* (Annelida: Phyllodocidae)

Joachim Langeneck¹ · María Emilia Diez² · Arne Nygren³ · Sergio Salazar-Vallejo⁴ · Luis Fernando Carrera-Parra⁴ · Tomás Vega Fernández^{5,6} · Fabio Badalamenti^{6,7} · Alberto Castelli¹ · Luigi Musco⁶

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Abstract

A phyllodocid polychaete belonging to the genus *Eulalia* is reported from Nuevo Gulf, Patagonia (South-western Atlantic Ocean) with abundant populations thriving in the intertidal zone. Morphological and molecular data allowed assigning this population to *Eulalia clavigera* (Audouin & Milne-Edwards, 1834), a species typically occurring along the north-eastern Atlantic coast. The absence of genetic structuring between north-eastern and south-western Atlantic *E. clavigera* strongly supports a non-native origin of the Patagonian population. Conversely, the majority of the Mediterranean *Eulalia* cf. *clavigera* analysed in this study turned out to belong to a different, probably undescribed species, suggesting that the diversity and taxonomy of green *Eulalia* is more complex than previously supposed. The high adaptation capabilities to stressed environments showed by *E. clavigera*, along with its possible high impact on native assemblages through predation, compel to carefully monitor its spread along the Patagonian coasts.

Keywords Non-native species · Phyllodocidae · Predation · Cryptogenic species · Species complex · Molecular characterisation

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✉ Joachim Langeneck
jlangeneck@biologia.unipi.it

¹ Department of Biology, University of Pisa, via Derna 1, 56126 Pisa, Italy

² Laboratorio de Parasitología (LAPA), Instituto de Biología de Organismos Marinos (IBIOMAR), (CCT-CONICET-CENPAT), Blvd. Brown, 2915 Puerto Madryn, Argentina

³ Sjöfartsmuseet Akvariet, Karl Johansgatan 1-3, 41459 Göteborg, Sweden

⁴ Depto. Sistemática y Ecología Acuática, El Colegio de la Frontera Sur, Chetumal, Quintana Roo, Mexico

⁵ National Research Council (CNR)—Institute of Coastal Marine Environment (IAMC), Calata Porta di Massa, 80133 Naples, Italy

⁶ Stazione Zoologica Anton Dohrn, Villa Comunale, 80121 Naples, Italy

⁷ National Research Council (CNR)—Institute of Coastal Marine Environment (IAMC), Marine Ecology Laboratory, Via Giovanni da Verrazzano 17, 91014 Castellammare del Golfo, Italy

Introduction

The introduction of non-native species represents a major threat to natural ecosystems, especially when the introduced forms become invasive and eventually affect ecosystem functioning and human activities (Vilà et al. 2010), thus producing relevant economic losses (Pimentel et al. 2001). In the last decades, biological invasions in marine environments have dramatically increased, chiefly due to the technical and logistic improvements of maritime trade and the development of the transport network (Hulme 2009). The effects of non-native species colonising a new environment are often unpredictable, and even in the instance of an initial economical gain, the invasion process has usually a negative ecosystem impact, possibly leading to a complete change in natural assemblages (Molnar et al. 2008; Jeschke et al. 2014). For this reason, monitoring of biological invasions is essential for environmental management, allowing to plan impact reduction and, where possible, mitigation strategies (Wittenberg and Cock 2001). Monitoring plans aimed at early tracking of non-native species should concentrate on some areas that are