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Recent discoveries of alien *Watersipora* (Bryozoa) in Western Europe, with redescriptions of species

JOHN S. RYLAND[1,5], HANS DE BLAUWE[2], RICHARD LORD[3] & JOSHUA A. MACKIE[4]

[1]*Department of Biological Sciences, School of the Environment and Society, Swansea University, Swansea SA2 8PP, Wales. E-mail: j.s.ryland@swansea.ac.uk*
[2]*Watergang 6, 8380 Dudzele, Belgium*
[3]*Sealord House, Montville Road, St Peter Port, Guernsey GY1 1BQ*
[4]*Department of Biological Sciences, California State University, 1 Washington Square, San Jose, CA 95192-0100, USA*
[5]*Corresponding author*

Abstract

We report the introduction of the encrusting bryozoan *Watersipora subtorquata* to Atlantic coasts of Europe. This species is highly invasive, having become common on coastlines throughout cool-temperate areas of the world since the 1980s. Confusion exists over the identity of this and other *Watersipora* species, which lack characters that are conventionally used in bryozoan systematics. *W. subtorquata* has not been well distinguished from *W. cucullata* which, reports dating back to the mid 1800s suggest, is native to the Mediterranean Basin or represents an early shipping introduction. *W. cucullata* has been placed in synonymy with *W. subovoidea*, a taxon lacking a holotype. We designate a neotype for *W. subovoidea*, recognizing its conspecificity with *W. cucullata*, and demonstrate a simple morphometric means of separating this species from *W. subtorquata* using zooid feature ratios (operculum area versus total frontal shield). An orange watersiporid population that was first recognized in Guernsey, in the European-Atlantic, in 2007, is shown by morphometric and mitochondrial genetic analysis to match *W. subtorquata*. It contains the commonest, widely introduced COI haplotype that, along with other evidence, suggests recent transfer via shipping traffic to Europe. A second population (previously referred alternatively to *W. aterrima* or *W. subovoidea*) has been reported from Brittany and Bordeaux (Atlantic coastline, France). This population is also aligned with *W. subtorquata* based on morphometrics and COI haplotype. In contrast to the Guernsey introduction, the earlier French-Atlantic introduction appears related to oyster imports from Japan.

Key words: Invasive marine bryozoans, zooid morphometrics, colony colour, neotype, cytochrome oxidase I, transport on ships, oysters

Introduction

We detail the discovery of recently established immigrant populations of the bryozoan genus *Watersipora* on west European coastlines and present the results of taxonomic and genetic investigations necessary for resolving species status in a genus that includes a group of aggressively invasive members — the *arcuata/aterrima/subovoidea/subtorquata* complex (Ryland 1965, 1967, and references therein; Mackie *et al.* 2006). Their role in marine fouling, ability to travel on ships' hulls and colonizing potential are well known. For example, the blackish *W. arcuata* (at the time identified as *W. cucullata*, see Banta (1969) and Ryland (1974)) was introduced first to Sydney Harbour, Australia, and elsewhere in New South Wales (Allen 1953) and thence to Auckland, New Zealand (Skerman 1960). Subsequently, in both southern Australia and New Zealand, *W. arcuata* has been displaced by the dark orange *W. subtorquata* (Gordon & Mawatari 1992; Keough & Ross 1999). It is also probably introduced in South Africa (Florence *et al.* 2007). Some of the

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