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Research paper

A new genus and species of colonial rugose coral from late Tournaisian (Waulsortian) mud-mounds in Ireland: Its ecological associations and depositional setting

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Abstract

A new genus and species of fasciculate rugose coral, *Howthia suttonensis* Somerville and Rodríguez, has been recorded from Howth peninsula, County Dublin, Ireland, in Waulsortian mud-mound limestones of upper Tournaisian age. The new colonial genus is characterized by having an axophyllid axial structure, steeply inclined tabellae, and presence of interseptal and lonsdaleoid dissepiments. It evolved probably from a solitary *Axophyllum* by the development of peripheral offsets. This new taxon may have been an ecological pioneer adapting to a specialised niche near the top of a large Waulsortian mud-mound in shallower water than most Waulsortian settings and, as such, may have provided a novel evolutionary opportunity. *Howthia suttonensis* is associated with *Amplexocarinia* and an unusual form of '*Fasciculophyllum*', both of which display budding and protocoloniality, as well as the fasciculate tabulate coral *Syringopora*.

Keywords: Rugose colonial corals; Mississippian; Systematics; Ecology; Mud-mounds; Ireland

1. Introduction

It has long been recognized that Mississippian mud-mounds are generally poor in rugose corals and normally contain sparse, small, solitary undissepimented taxa, such as *Amplexus*, *Cyathaxonia*, and zaphrentids. They are associated with tabulate corals represented by occasional *Syringopora* and *Michelina* colonies (Hudson et al., 1966; Ramsbottom in McKerrow, 1978; Mundy, 1980, 1994; Somerville et al., 1992a; Somerville, 2003). The Mississippian mud-mounds are characterized also by having fine-grained peloidal mudstone/wackestone lithofacies with complex cavity systems containing internal geopetal sediments and radiaxial fibrous marine cements, often referred to as stromatactis cavities (Lees and Miller, 1985, 1995; Somerville et al., 1992a,b; Mundy, 1994; Pickard, 1996; Somerville, 2003). The mud-mounds have demonstrable topographic relief and often can be differentiated into a massive core and bedded flank and cap facies (Lees and Miller, 1985, 1995; Somerville et al., 1992a,b; Mundy, 1994; Lees, 1997; Somerville, 2003). The mounds may be initiated on crinoidal-rich wackestone or bioclastic rudite facies. The mud-mound geometry is variable, ranging from isolated domes to clusters of stacked or coalesced mounds, or forming laterally extensive tabular banks and sheets (Lees and Miller, 1995; Somerville, 2003). Many of the mud-mounds, especially in the Tournaisian, developed on the distal parts of ramps, in relatively deep water, low energy, quiet water environments without dasyclad algae (Lees and Miller, 1985, 1995; Somerville et al., 1992b; Jeffery and Stanton, 1996). Waulsortian mud-mounds are known to extend from New Mexico to Western Europe and possibly South China. In the Viséan, many mud-mounds tend to develop at the margins of shelves adjacent to deep-water basins or within shallow-water shelf settings, but Waulsortian-type mud-mounds persist still in deeper shelf and basinal settings (Kelly and Somerville, 1992; Somerville et al., 1992a; Mundy, 1994; Somerville, 2003). In the shallower water Viséan mounds, colonial rugose colonies

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can form rich concentrations at or near the top of mounds, especially in the Asbian and Brigantian, where locally they can form frameworks (Mundy, 1994; Somerville et al., 1996; Somerville, 1997, 2003; Rodríguez and Somerville, 2007, in this volume). An unusually rich and diverse assemblage of rugose corals, both solitary and colonial (fasciculate and cerioid) forms, was recorded at the top of the >90 m-thick Brigantian mud-mound at Ardagh Quarry, Kingscourt, Ireland, where occur large colonies, up to 2 m in diameter, of *Siphonodendron*, *Corwenia* and '*Koninckophyllum*' (Somerville et al., 1996; Rodríguez and Somerville, 2007, in this volume). This suite of fasciculate and solitary rugosans is characteristic of Rugose Coral Assemblage RCA6 of Somerville and Rodríguez (2007). A similar suite of taxa including *Diphyphyllum* and *Tizraia* has been recently recorded from the top of Upper Viséan mounds in Morocco (Said et al., 2007; Said and Rodríguez, 2007).

Investigations in older Tournaisian mud-mounds in the Dublin Basin, Ireland has yielded local pockets of solitary rugose corals, such as the fauna collected from the well-known Feltrim Quarry (Hudson et al., 1966) and from boreholes in the basin (Somerville et al., 1992b). However, until recently, no colonial rugose corals have ever been recorded from Waulsortian mounds. But a recent discovery from a small patch of mostly dolomitized Waulsortian facies at Sutton on the Howth penin-

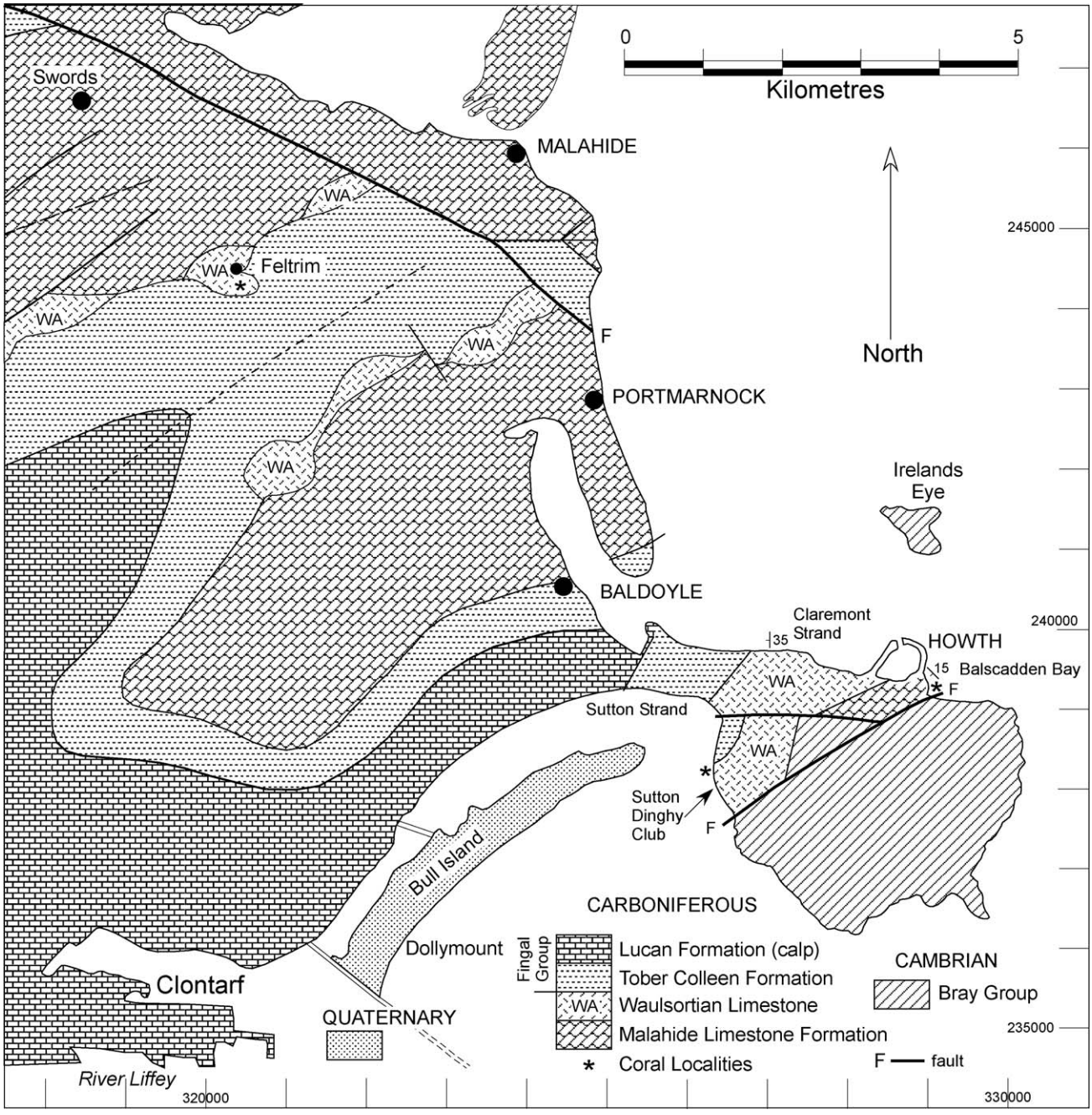

Fig. 1. Location map of north County Dublin area of the Dublin Basin (from 1:100 000 GSI Sheet 13 (McConnell et al., 2001) and Sheet 16 (McConnell and Philcox, 1994).