

## MICROFAUNAL ANALYSIS OF THE WATTONENSIS BEDS (UPPER BATHONIAN) OF SOUTH DORSET



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Hart, M.B., De Jonghe, A., Grimes, S.T., Metcalfe, B., Price, G.D. and Teece, C. 2009. Microfaunal analysis of the Wattonensis Beds (Upper Bathonian) of South Dorset. *Geoscience in South-West England*, **12**, 134-139.

The Wattonensis Beds (Upper Bathonian) are exposed in the low cliffs to the east of Rodden Hive Point (Dorset). This locality is famous for the abundance of the otolith fauna described in the 1960s. The presence of this otolith fauna is confirmed with new material collected in 2008. Along with the otoliths are a number of statoliths, the aragonitic bones found in the heads of squid-like cephalopods and almost certainly un-described. Many of the otoliths and statoliths are encrusted with adherent foraminifera, as are the numerous shell fragments found in these clays.

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**Keywords:** Wattonensis Beds, Bathonian, Dorset, otolith, statolith, foraminifera.

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### INTRODUCTION

In the geological literature about the Dorset Coast the Wattonensis Beds of the Upper Bathonian are recorded as containing one of the most abundant assemblages of Jurassic otoliths in the U.K. (Stinton and Torrens, 1968; House, 1993; Cox and Page, 2002). Stinton and Torrens (1968) indicate that, in their experience, the average sample of clay from the Bathonian in the U.K. yields 1 otolith per kg of sediment while the Wattonensis Beds at Rodden Hive Point yielded the 'extraordinary' figure of 10 specimens per kg. The database on which these judgments were made is, however, somewhat limited with only the work of Frost (1924, 1926) and the research of Stinton and Torrens (1968) recording the presence of otoliths in Jurassic sediments. In our recent work on the Wootton Bassett Mud Springs (Hart *et al.*, 2006; Price *et al.*, 2009) we did find significant numbers of otoliths, although the mechanism by which they were sampled is atypical (fluid mud oozing from natural springs). Field samples were, therefore, collected from the Wattonensis Beds on the shore of the Fleet Lagoon in South Dorset in order to make a direct comparison with the work of Stinton and Torrens (1968).

Rodden Hive Point (SY 599821) is located WSW of Langton Herring on the shore of the Fleet Lagoon (Figure 1). The section is almost inaccessible, backed by private land and often rather muddy of access: permission should be sought, for both visiting and sampling, from the Strangways Estate. About 90-100 m east of the point there are abundant, beautifully preserved macrofossils littering the foreshore, all of which appear to have been washed out from the Wattonensis Beds (Cox and Page, 2002). Samples were collected from the lumachelle that marks the Elongata Beds and the soft clays that occur below, and to the west of, the shell bank. This is one of the best exposures of the Wattonensis Beds which are ~1 m thick (Figure 2). All the previous authors, beginning with Stinton and Torrens (1968) describe the shell fragments, and the

otoliths recovered from these clays, as being encrusted with 'microfaunal bryozoa and serpulids'. As part of our investigation of the otoliths and the shell material from the succession we have studied this epifauna and determined that the overwhelming majority of the taxa are not bryozoans or serpulids but adherent foraminifera. For comparison, shell fragments from the mid-Upper Jurassic of Poland (Pugaczewska, 1970) also carry abundant specimens of serpulids, bryozoans and foraminifera (including taxa described here).

### OTOLITHS

Otoliths are the stato-acoustic organs of bony (teleost) fish and are often quite well preserved as fossils as they are composed of calcium carbonate (Stinton and Torrens, 1968; Lowenstein, 1971; Hart *et al.*, 2006). On each side of the fish the 'labyrinth' has three otoliths which are located adjacent to the sensory spots. The largest is the sagitta and this is located in the sacculus. The second otolith lies in the lagena (asteriscus) while the third is in the utriculus (lapillus). The sagitta is the largest and most commonly described in the fossil record. The side of the sagitta facing the median plane of the body is the 'inner side' and is usually flatter in comparison to the "outer side" that often shows a range of grooves or other features.

In their account of Bathonian otoliths, many of which came from the Wattonensis Beds of Rodden Hive Point, Stinton and Torrens (1968) created ten new taxa which represent the whole of the recovered fauna. Many of these taxa have been found in this current investigation (Figure 3). Along with the otoliths, in lesser numbers, are a number of similar microfossils that have not been described previously. These are the statoliths.