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SHORT NOTES

The sponge-inhabiting barnacle *Acasta spongites* (Poli, 1795) (Crustacea, Cirripedia), a first record for the southern North Sea: how artificial habitats may increase the range of a species

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Barnacle species of the genus *Acasta* Leach, 1818 are obligate symbionts mostly found on Demospongiae (Choristida, Axinellida, Poecilosclerida, Haplosclerida and Dictyoceratida) (1; 2) although some species are associated with Anthozoa (Alcyoniaria, Octocorallia and Antipatharia) (2; 3). Twenty seven species belonging to this genus have been described (2), most of them distributed in tropical, subtropical and warm temperate regions of the world. *Acasta spongites* (Poli, 1795) is the only known member of the genus occurring in northeast Atlantic waters.

The known geographic occurrence of *A. spongites* ranges from the British Isles (4-6) to the Mediterranean (4; 7; 8) through the Atlantic coast of France (9; 10). The species is apparently not reported from the North Sea (11). It is also mentioned in the Red Sea, Japan and South Africa (12) but these records may need confirmation. The occurrence around the British Islands is restricted to the south and southwest coasts only (13) and it is also noted on the south coast of Ireland (13). Overall, the number of recent records remains very limited. The earlier presence of the species in the English Channel was documented in The Plymouth Marine Fauna (14) and the species list of Glaçon (15). However, although recent records are rather scarce, the species is not uncommon in suitable habitats of the western Channel (own observations).

A. spongites is a sublittoral species living embedded in various species of Demospongiae (7; 16). In north-western European waters, *A. spongites* is invariably found associated with the sponge *Dysidea fragilis* (Montagu, 1818) (5; 6; 17; 18). The sponge and its host need hard substrates for their establishment, which is obviously a limiting factor for the spread of both species.

The Belgian Continental Shelf consists mostly of sandy sediments with some patches of pebbles in gullies between sandbanks (19). However, typical epifaunal species are present on the large number of shipwrecks that can be found in the Belgian marine waters (20-23). Until recently, these offshore hard substrates received little attention and their biota remained largely unknown. A recent investigation that studied the epifauna of four shipwrecks in Belgian marine waters was undertaken between 2003 and 2005 and revealed the presence of *A. spongites* on one of the sites. This shipwreck, the Kilmore, sank in 1906 and lies southwest of the Westhinder sandbank, 32km offshore (N051°23'.730 - E002°29'.790; WGS84) at a depth of 30m (LMWS). Sixty three quantitative samples (frames of 25x25cm) were scraped from the surface of the shipwreck. Two of these samples revealed the presence of a total of three specimens of *A. spongites* in samples taken at five meters above the bottom. The first specimen was found in March 2005. It measured 8.6mm (basal diameter), by 9.2mm (height from base to summit of the carina) (Fig. 1). The sizes of the two specimens found in August 2005 were 3.9x3.6mm and 3.0x3.2mm, respectively. Mature size given for this species in the literature is about 8mm in basal diameter (6; 7) indicating that at least the specimens from March can be considered as adults. They were all associated with the sponge *D. fragilis*. This sponge was identified on 13% of all the samples from the Kilmore and on 10% of all the samples from prospected Belgian shipwrecks (N=192). The fouling community of the Kilmore was dominated by the hydrozoan *Tubularia indivisa* Linnaeus, 1758, which covered most of the shipwreck surface. A more detailed description of the epifaunal communities on shipwrecks can be found elsewhere (20-23). Other barnacles found during the study of Belgian shipwrecks included *Verruca stroemia* O.F. Müller, 1776 and *Balanus crenatus* Bruguiére, 1789.

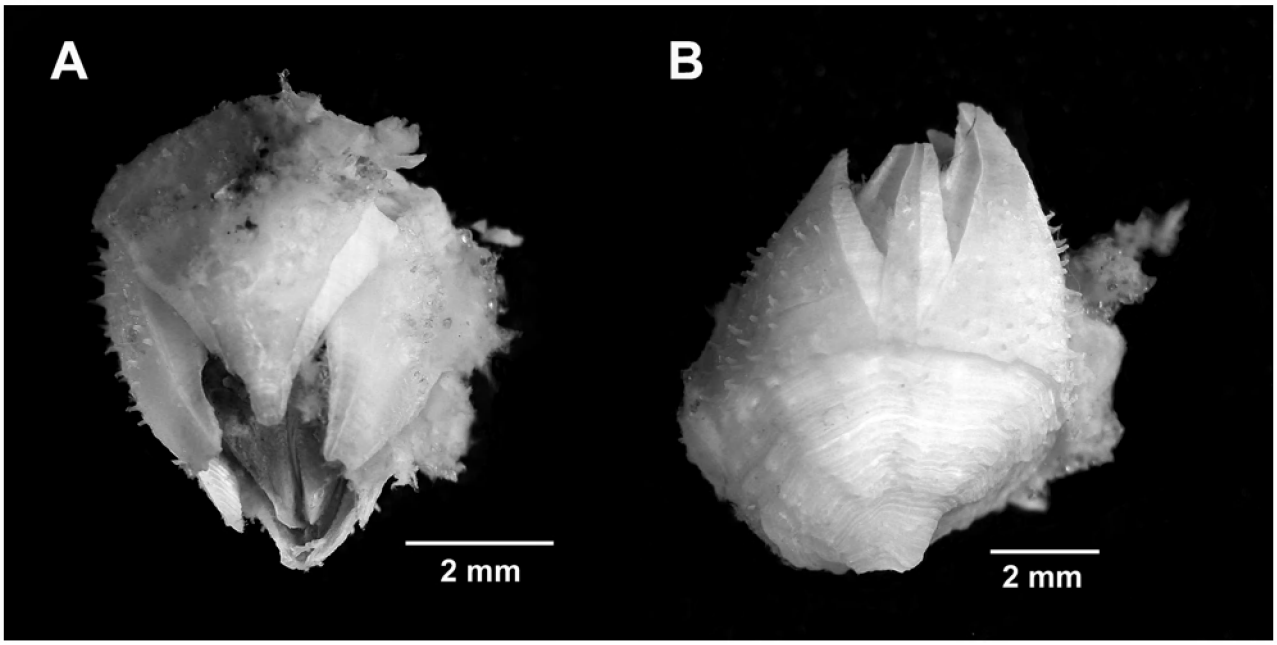

Fig. 1. – Photograph of *Acasta spongites* sampled on the Kilmore shipwreck. A: view of the operculum. B: lateral view.

This is the first record of *A. spongites* for Belgium and for the Southern Bight of the North Sea. It has not been found on other shipwrecks yet, but it is reasonable to think that a more intensive sampling effort would bring new records from other sites on natural and artificial hard substrates. Furthermore, *D. fragilis* was identified on other shipwrecks. Since *A. spongites* lives in a sponge that largely covers the barnacle, its presence may remain unnoticed to the unskilled observer.

Recently, other barnacle species with warm water affinities such as *Balanus perforatus* Bruguiére, 1789 and *Balanus amphitrite* Darwin, 1854 as well as more exotic species have been discovered in the waters off the southern North Sea (24, and Kerckhof unpublished records) and in the English Channel (25). This indicates that certain barnacle species are spreading to the north or establishing themselves as a response to recent climate changes, which are predicted to result in broad planktonic, pelagic and benthic community changes (26; 27). However, certain particular habitats were not thoroughly sampled in the past, so it is difficult to assess if the presence of a certain species with southern affinities might be the result of a range extension, due to the recent warming up, or if it was present over a longer period of time and overlooked/neglected in the past.

The fauna of the eastern part of the English Channel can be considered as an impoverished version of the western part. Many species present in the western English Channel are apparently absent in the eastern part while all species present in the east are generally present in the west (28). This distribution pattern of species is thought to be mostly a result of a temperature gradient with warmer and less fluctuating temperatures in the western English Channel than in the eastern part. However, the absence of suitable habitat may also prevent the larvae of some species that need hard substrates from surviving long enough to find an appropriate settling place. Hard substrates are indeed available for the settlement of epifaunal species around the Dover Strait because of the strong currents, which prevent sedimentation in this particular area (29; 30). However in the areas immediately adjacent to the Dover Strait, only isolated patches of natural hard substrates remain. This strongly limits the probability for larvae of epifaunal species to find a suitable settling place. Our finding is an illustration of the fact that so-called southern epifaunal species can penetrate into the southern North Sea and survive, provided that suitable habitat, such as shipwrecks, is present.

Until recently, hard substrates in Belgian marine waters received little attention due to their limited presence and the practical problems of sampling them. Nonetheless, our findings support the view that certain particular and rare/uncommon habitats such as hard substrates, whether artificial or not, might act as stepping stones and thus enhance the further spread of certain warm water species limited to hard substrates further into the North Sea. It should be noted that the sponge itself, *D. fragilis*, has only been recently recognized as occurring in the southern North Sea (20).

In Belgian marine waters, *A. spongites* lives under the influence of Atlantic water masses that pass through the English Channel. Generally, the residual current runs from southwest to northeast (31). This ensures a high salinity and a steady supply of larvae. In the region of the Hinderbanks, other species with southern affinities (molluscs, bryozoans) have recently been found and were previously unknown to the southern North Sea (23; Houziaux; Kerckhof unpublished data). Further to the north, in the Dutch and German part of the North Sea, similar regions occur with patches of natural hard substrate and shipwrecks that might be suitable for the establishment of a whole suite of epifouling species with southern affinities. However, all these particular habitats have been and still are incompletely known, which ham-

pers the ongoing discussion on the possible effects of climate change.

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