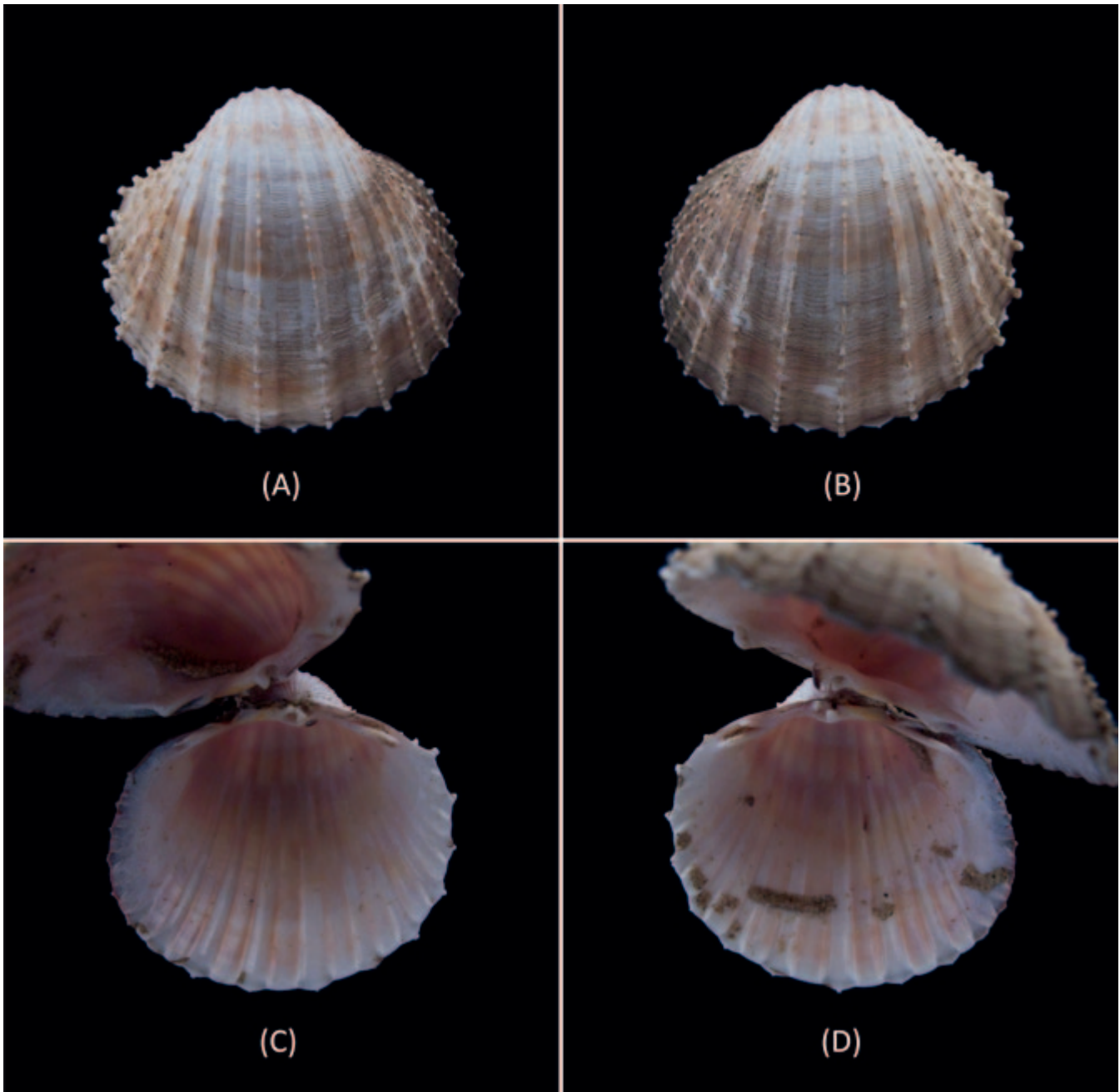


## FIRST EVIDENCE OF THE POORLY RIBBED COCKLE, *ACANTHOCARDIA PAUCICOSTATA* (G. B. SOWERBY II, 1834) IN UK WATERS.

A complete, articulated shell of *Acanthocardia* spp. was found in the intertidal mid-low shore area of a site in the Solent, in July 2016. The specimen was generally, in good condition (Fig. 1 A–D). The valves of the shell were thin and relatively fragile in comparison to other *Acanthocardia*

species. The internal surfaces of the shell are furrowed and the right valve has remnants of narrow faunal sandy tubes adhering to the surface (Fig. 1C–D).

The transverse shape, or cross-section of the ribs, is quite angular, or low and triangular, as



**Figure 1** *Acanthocardia paucicostata* external and internal views.



Figure 2 Dorsal view of *A. paucicostata*.

opposed to being more rounded or flattened. The striations between and across the ribs are very fine. The colour is off-white with russet bands. On the posterior edge of both valves the colouration is a notably darker, muddy brown colour (Fig. 1 A–B). The right valve has 17 ribs and the left valve 16 ribs (Fig. 2). These features identify the specimen as *Acanthocardia paucicostata* (G. B. Sowerby II, 1834), the poorly ribbed cockle<sup>1,2</sup>. The specimen measures 25.68mm (length)×24.05mm (width)×18.45mm (breadth).

Tebble<sup>3</sup> notes that when collecting shells ‘along the shore line’ diagnostic features may have been eroded over time and that, ‘the ligament in particular is often missing’. Given that the ligament still held the shell halves together and that more generally, the specimen appeared in good condition it is tentatively suggested that it had not been transported any great distance in either space or time (Figs 1 & 2). It is worth noting however, that colour can be preserved in *Acanthocardia* specimens from previous geological epochs, though not all molluscan pigments can survive these long journeys in time<sup>4,5</sup>.

The species clearly has a relative paucity of ribs in comparison to other species in the genus. The common name is almost a direct translation of the Latin name for the species (‘pauci-’ from *paucitas*, meaning ‘few’ and, ‘-costata’ from ‘*costatus*’ meaning ‘rib’).

Specific site details and other relevant information have been recorded and entered into the database held by the Conchological Society. The location was in the west Solent area on

the south coast of the UK. Accession number: NMW.Z.2016.018.00001.

*Acanthocardia paucicostata* is found in the Mediterranean<sup>6</sup>, Black Sea<sup>4</sup> and the Sea of Azov<sup>4</sup> but, also more widely, as far west as the Canaries<sup>2</sup>, south to Gambia<sup>4</sup>, Africa and, northwards from southern Portugal<sup>7</sup>, northwest Spain<sup>8</sup> and up into the Bay of Biscay<sup>9,10</sup>.

Marine Bivalve Shells of the British Isles indicates the reported occurrence of the species from the Netherlands<sup>11</sup>. Goud<sup>12</sup> notes that initial reports of the species were thought most likely to be well preserved specimens washed out from clay balls associated with the Eemian, a previous interglacial period. However, in January 2002 Goud<sup>11</sup> collected a fresh specimen from Lake Grevelingen on the south-east coast of the Netherlands. The species is considered to be non-native or, alien to Dutch coastal waters and it has been suggested that the probable introduction pathway was via ship ballast water<sup>11,12</sup>.

In 1913 Dautzenberg<sup>13</sup> reported *A. paucicostata* from beaches in Brittany and David Fenwick Snr (pers. comm.) has a specimen from Brittany collected in 1964. In the late 1970’s it was reportedly found from the Bay of St Malo, northern Brittany however, Goud<sup>12</sup> noted that these records required confirmation<sup>14,15</sup>. More recently, La Perna and D’Abramo<sup>4</sup> provided clear evidence of its presence west of Paimpol on the coast of northern Brittany, France.

Evidence in the literature clearly suggests that the species has been found as far north as Brittany for some considerable time. Equally, it seems recorded confirmation of its presence in the English Channel (northern Brittany) is quite recent. Did the Ushant front found off the north-west tip of Brittany act as an effective biogeographic barrier to a species at the northern edge of its distribution? If so, how did it overcome that block and establish itself on the northern coast of France? Has climate change enabled this range extension or has the expansion been aided more generally, by direct mechanisms such as ballast water transfer of planktonic stages? Jolly *et al.*,<sup>16</sup> have reported sharp genetic breaks between Atlantic and English Channel populations of the polychaete *Lagis koreni*, along the north coast of France. Similar investigations would help reveal the origins of the populations of *A. paucicostata* now present within the Channel.

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Peter Barfield,  
Institute of Marine Sciences,  
School of Biological Sciences,  
University of Portsmouth,  
Ferry Road,  
Portsmouth,  
PO4 9LY

#### REFERENCES

- <sup>1</sup>Oliver, PG, Holmes AM, Killeen IJ & Turner JA 2016 *Marine Bivalve Shells of the British Isles*. Amgueddfa Cymru – National Museum Wales. Available from: <http://naturalhistory.museumwales.ac.uk/britishbivalves>.
- <sup>2</sup>Wilkinson S 2010 *Acanthocardia paucicostata*. Conchological Society of Great Britain and Ireland. [cited 9/7/2016]. Available from: <http://www.conchsoc.org/spAccount/acanthocardia-paucicostata..>
- <sup>3</sup>Tebble N 1966 *British Bivalve Seashells. A Handbook for Identification*, 2<sup>nd</sup> ed. Edinburgh: British Museum (Natural History), Her Majesty's Stationary Office.
- <sup>4</sup>La Perna R & D'abramo M 2013 Systematics of the *Acanthocardia paucicostata* group in the Mediterranean Plio-Pleistocene, with description of a new species (Bivalvia, Cardiidae) *Journal of Conchology* 41(4): 481–492.
- <sup>5</sup>Comfort A 1951 The pigmentation of molluscan shells *Biological Reviews* 26: 285–301.
- <sup>6</sup>Ter Poorten J & Gofas S 2017 *Acanthocardia paucicostata* (G. B. Sowerby II, 1834). In: MolluscaBase (2017). Accessed through: World Register of Marine Species at <http://www.marinespecies.org/aphia.php?p=taxdetails&id=138993> on 2017-04-05.
- <sup>7</sup>Rufino MM, Gaspar MB, Pereira AM, Maynou F, & Monteiro CC 2010 Ecology of megabenthic bivalve communities from sandy beaches on the south coast of Portugal *Scientia Marina* 74(1): 163–178.
- <sup>8</sup>Cadée GC 1968 Molluscan Biocoenoses and Thanatocoenoses in the Ria De Arosa, Galicia, Spain *Zoologische Verhandlinge* 95(1): 3–121.
- <sup>9</sup>Ter Poorten JJ 2003 The Cardiidae of Morbihan and Loire-Atlantique, France. An overview of the encountered species with remarks about morphology, ecology and distribution *Gloria Maris* 41(6): 112–140.
- <sup>10</sup>Carpenter KE & De Angelis N eds 2016 *The living marine resources of the Eastern Central Atlantic Volume 2: Bivalves, gastropods, hagfishes, sharks, batoid fishes and chimaeras* FAO Species Identification Guide for Fishery Purposes Rome, FAO. pp. 665–1509.
- <sup>11</sup>Goud J 2002 De Tere hartschelp, *Acanthocardia paucicostata* (Sowerby) (Bivalvia, Heterodonta, Cardiidae) nu in de Grevelingen gevestigd? *Basteria* 66: 106.
- <sup>12</sup>Goud J 2004 The recent introduction of the poorly ribbed cockle, *Acanthocardia paucicostata* (Bivalvia, Cardiidae), in the Grevelingen *Vita Malacologica* 2: 39–44.
- <sup>13</sup>Dautzenberg P 1913 *Atlas De Poche Des Coquilles Des Côtes De France (Manche, Océan, Méditerranée) Communes, Pittoresques ou Comestibles* Paris Librairie Des Sciences Naturelles, Available from: <http://ia600504.us.archive.org/9/items/atlasdepochedesc00dau/atlasdepochedesc00dau.pdf>
- <sup>14</sup>Bouchet P, Danrigal F & Huyghens C 1978 *Coquillages des côtes atlantiques et de la Manche*. Editions du Pacifique: Papeete. ISBN 2-85700-099-5. 144 pp.
- <sup>15</sup>Rétiere C 1979 *Contribution à la connaissance des peuplements benthiques du golfe Normanno-Breton* Thèse de Doctorat d'État ès Sciences Naturelles, Université de Rennes, 421 pp.
- <sup>16</sup>Jolly MT, Jollivet D, Gentil F, Thiébaud E & Viard F 2005 Sharp genetic break between Atlantic and English Channel populations of the polychaete *Pectinaria koreni*, along the north coast of France *Heredity* 94: 23–32.