

# CORACUTA OBLIQUATA N. GEN. (CHASTER, 1897) (BIVALVIA: MONTACUTIDAE) – FIRST BRITISH RECORD FOR 100 YEARS

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*Abstract* *Coracuta obliquata* n. gen. is recorded from Carmarthen Bay in the Bristol Channel, providing the first British record in 100 years and the first live record in British waters. Its previous generic placements are discussed and hinge structure compared with similar galeommatids. A full description of the species and of the new genus are given and a lectotype is designated.

*Key words* *Coracuta obliquata*, *Galeommatoida*, *Britain*

## INTRODUCTION

In July 2003 benthic sampling was carried out as part of the Outer Bristol Channel (OBC) Marine Habitat Study led by the National Museum of Wales (NMW) and the British Geological Survey (BGS), and supported by major grants from the Aggregates Levy Sustainability Fund (ALSF) for Wales and England. The survey, researching macrobenthic invertebrate communities and sediment characterisation in the outer Bristol Channel, collected grab samples from 148 sites. In six of these sites the identification team of Jennifer Gallichan & Harriet Wood isolated a tiny bivalve which they identified as “galeommatid sp.” This material was subsequently identified as ‘*Neolepton obliquatum* Chaster, 1897 a species described from off Northern Ireland but which had not been subsequently recorded from British or Irish waters.

This paper re-describes this species, selects a lectotype from the Chaster collection, and creates a new generic name.

## METHODS

The material was collected using a 92 kg 0.1 m<sup>2</sup> modified Van Veen grab. The animal fraction was floated off each sample before sieving through a 0.5mm mesh sieve. All material was fixed in formaldehyde and subsequently preserved in 70% ethanol.

Shells were prepared for imaging by softening the tissue in a detergent, removing the soft parts mechanically and drying in air. The light photography was made using a digital macroscopic system with computer enhancement via

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AutoMontage™ software. Scanning electron micrographs were made following gold coating and back-scattered imaging. The anatomical photograph was made from specimens stained in Rose Bengal and photographed with the AutoMontage™ system. Details and interpretation of the anatomy came from histological preparations made by Jorgen Lützen, Institute of Zoology, Copenhagen.

## SYSTEMATICS

Bivalvia  
Galeommatoida  
Montacutidae

*Coracuta* n.gen.

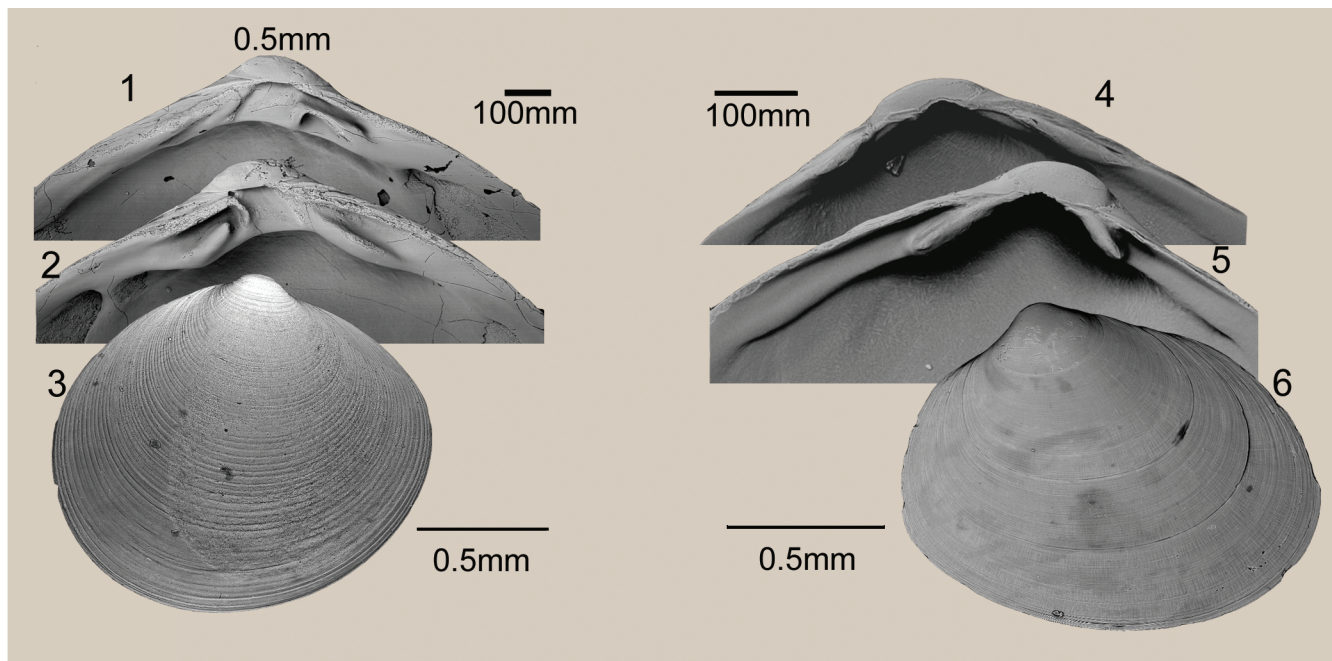
Type species *Neolepton obliquatum* Chaster, 1897

*Diagnosis* Shell very small, obliquely oval in outline, inequilateral, beaks towards the posterior. Sculpture of concentric raised threads some dichotomizing. Ligament large, internal; resilifer shallow, slightly posterior to beaks. Right valve with single anterior and posterior lateral teeth; Left valve with marginal flanges, single small tubercle beneath and slightly to the anterior of the beak. Ctenidium with single demibranchs, seminal receptacles present.

*Species included* Monotypic.

*Derivation of name* An allusion to *Montacuta* but for Cora, daughter of AM Holmes.

*Remarks* Chaster (1897) placed his new species in the genus ‘*Neolepton*’ based on valves from



**Figs 1-3** *Neolepton sulcatulum*, Guernsey, Marshall coll. NMW.1953.183.101 **Fig. 1** hinge of left valve **Fig. 2** hinge of right valve **Fig. 3** external of right valve. **Figs 4-6** *Mysella bidentata*, Irish Sea, NMW.Z.1991.076. 535 **Fig. 4** hinge of left valve **Fig. 5** hinge of right valve **Fig. 6** external of right valve.

Rathlin Island, Ireland. This generic placing was retained by Smith & Heppell (1991) and van Aartsen (1996a, b), although the latter stated that this was very doubtful. Salas (1996) subsequently redesignated it *Mysella obliquatum*, based on comparisons of the hinge structure with *Mysella bidentata* (Montagu, 1803), and CLEMAM now consider this the valid name of the species.

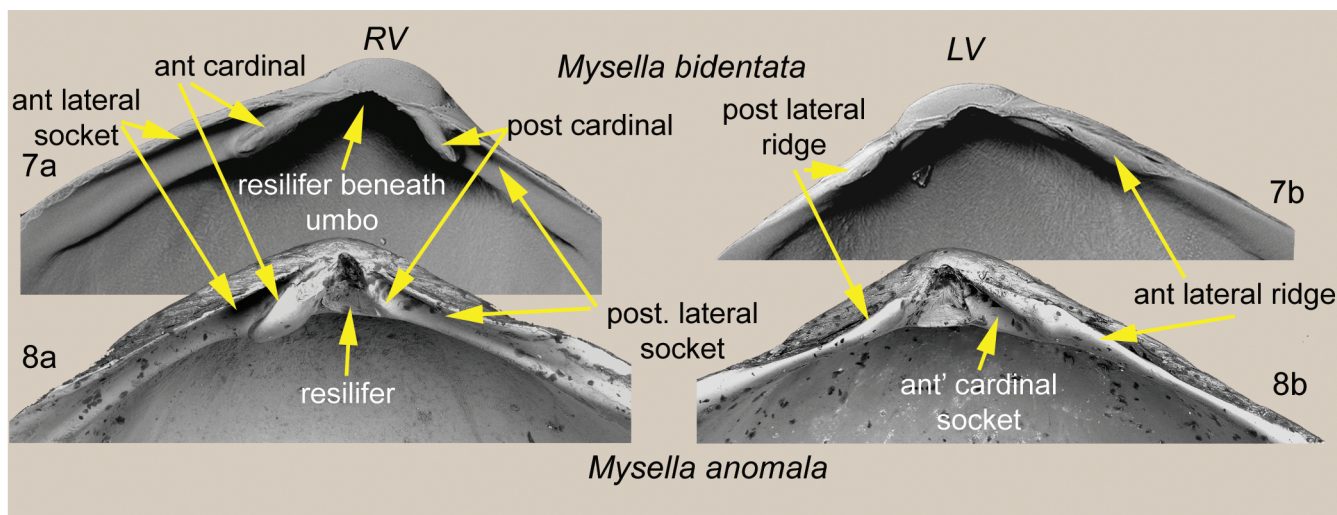
Comparisons with the type species of *Neolepton* (*Lepton sulcatulum* Jeffreys, 1859) (Figs 1-3) clearly confirm the erroneous original placement. However, many authors agree (Gofas, pers comm; Van Aartsen, 1996b; Kallonas, Zenetos & Gofas 1999), as do we, that the generic placement is still in question.

Salas (1996) transferred Chaster's species to *Mysella* based on comparisons with *M. bidentata*. A problem arises here from the likely erroneous generic placement of the widespread and common species universally referred to as *Mysella bidentata* (see figs 4-6) (Middlefart, in prep). We present images of the hinge of the type specimen of the type species of *Mysella*, *Mysella anomala* Angas, 1877 from south-east Australia, along with those of *M. bidentata* (see figs 7, 7a, 8, 8a). The hinges differ markedly with the hinge plate closing off the umbonal cavity in *M. anomala* but absent in *M. bidentata*. This results in a visible resilifer in *M. anomala* while in *M. bidentata* the

ligament attaches deep in the umbonal cavity. In our opinion neither of these hinge forms are seen in '*M. obliquata*' where the resilifer is slightly to the posterior, where the right valve anterior lateral is elongate and not projecting and where there is a tubercle in the left valve.

Recent literature (Coan, Scott & Bernard, 2000; Scott, 1998) applies the generic name *Rochefortia* Velain, 1878 to species with a *Mysella bidentata* type of hinge. We examined digital images and original line drawings (from MNHN, Paris) of the type specimen of the type of the genus, *Rochefortia australis* (Velain, 1878). The presence of a hinge plate and two equal-sized teeth confirms that *Rochefortia* is similar to *Mysella* and therefore that '*M. obliquata*' should not be assigned to *Rochefortia*.

A number of genera share hinge characteristics with *Mysella* notably *Montacutona*, *Curvemyssella* and *Nipponomyssella* and a wide-ranging review is required to assess the relationships and distinctiveness of these taxa. *Montacutona* species have a hinge similar to '*M. bidentata*' but differ in having a ctenidium with both demibranchs (Morton & Scott, 1989) and are therefore unlike *Coracuta*. The hinge of *Curvemyssella* is again similar to '*M. bidentata*' and the shell is very distinctive with its sickle shaped outline. We have not been able to examine the type species of *Nipponomyssella* but



**Figs 7, 7a** *Mysella bidentata* SEM of hinge details, Irish Sea, NMW.Z.1991.076. 535 **Figs 8, 8a** *Mysella anomala* Angas, Syntype, Port Jackson, New South Wales, Australia, BM(NH) 1877.5.12.108 SEM of hinge.

the illustrations in Yokoyama (1922) indicate a form very close to '*M.* *bidentata* with the diverging teeth and smooth shell. The *Nipponomysella subtruncata* (Yokoyama 1927) studied by Lützen, Takahashi & Yamaguchi (2001) is doubtfully congeneric with the type species of *Nipponomysella*, *Montacuta oblongata* Yokoyama 1922. In *N. oblongata* there is a large gap between the teeth, as in '*M.* *bidentata*, indicating the deep, umbonal attachment of the ligament. This contrasts with the *N. subtruncata* where ligament is attached to a hinge plate between the teeth.

The anatomy, especially the presence of seminal receptacles, links *C. obliquata* to the Galeommatoidea and Montacutidae in particular (Jespersen & Lützen, 2000). However, they are present in a number of nominal genera including *Mysella*, *Montacuta*, *Potidoma*, *Nipponomysella* and *Jousseamiella* (Jespersen & Lützen, 2000) and their presence is therefore not helpful for defining genera.

Despite the number of nominal genera available within the Montacutidae there is no adequate generic placement for this species and thus the new genus is proposed.

***Coracuta obliquata* n. gen. (Chaster, 1897)**

Figs 9-13, 14-16, 17

*Neolepton obliquatum* Monterosato 1875: *Conchiglie Mediterranee* Vol. v pp 1-50.

*Neolepton obliquatum* Chaster, 1897: *The Irish Naturalist* (for 1897): 186.

*Neolepton obliquatum* Chaster – Carrozza 1983: *Boll. Malac.* **19**: 70.

*Neolepton obliquatum* Chaster – Cianfanelli & Talenti 1987: *Boll. Malac.* **23**: 266.

*Neolepton obliquatum* Chaster- Smith & Heppell 1991: Checklist of British Marine Mollusca p. 66. "*Neolepton*" *obliquatum* Chaster- van Aartsen 1996: *La Conchiglia* n. 281 p.38.

*Mysella obliquata* (Chaster)- Salas 1996: *Haliothis* **25**: 62.

"*Neolepton*" *obliquatum* Chaster- Kallonas, Zenetos & Gofas 1999: *La Conchiglia* n. 291 p.18.

*Mysella obliquata* (Chaster)- CLEMAM 2005

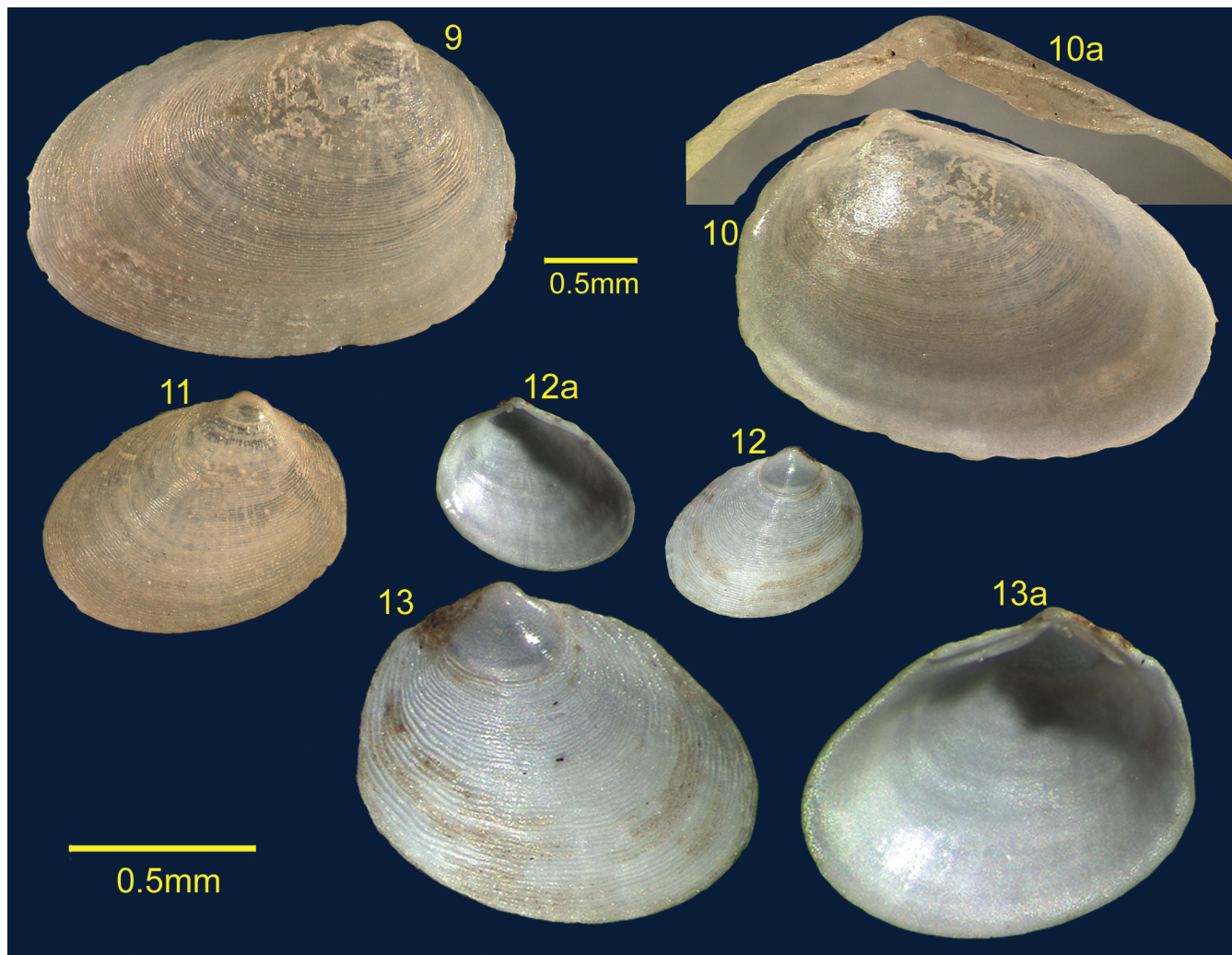
'*Mysella*' *obliquata* (Chaster)- Mackie *et al* (in press)

**MATERIAL EXAMINED**

*Type material* Lectotype herein designated, 1 lv., Church Bay, Rathlin Island, Antrim County (sea area 29a), G.W. Chaster colln NMW.1910.029.01826.

Paralectotype herein designated, 1 lv., as lectotype NMW.1910.029.01827.

*Other material* **3v.** Mouth of Kenmare River, between Bull Rk and Skerriff 44-47fm G.W. Chaster colln NMW.1910.029.01570. **6 spec.** Carmarthen Bay (OBC survey), Stn 55B, 51°27.674'N 04°47.382'W, 58.5m, NMW.Z.2003.048.1; **10 spec.** Carmarthen Bay (OBC survey), Stn 96A, 51°29.070'N 04°41.291'W,



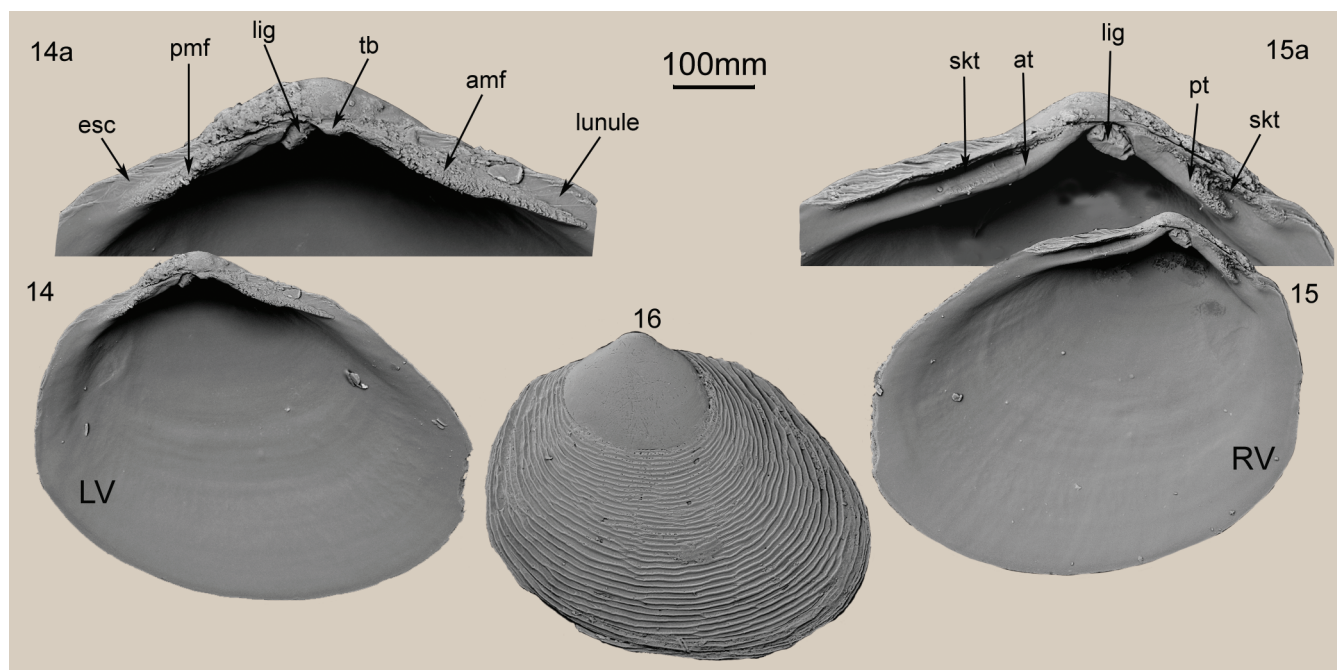
**Figs 9-13** *Coracuta obliquata* n.gen. (Chaster,1897) **Figs 9-10a**, Lectotype, left valve, NMW.1910.1826 **Fig.11** Paralectotype, left valve, NMW.1910.1827 **Figs 12, 12a**, left valve, Carmarthen Bay, NMW.Z.2003.048.2. **Fig 13** right valve, Carmarthen Bay, NMW.Z.2003.048.1.

52.6m, NMW.Z.2003.048.2; **21 spec.** Carmarthen Bay (OBC survey) Stn 97A, 51°28.436'N 04°44.024'W, 55.9m, NMW.Z.2003.048.3; **14 spec.** Carmarthen Bay (OBC survey), Stn 97B, 51°28.371'N 04°44.252'W, 55.9m, NMW.Z.2003.048.4; **32 spec.** Carmarthen Bay (OBC survey), Stn 98B, 51°24.581'N 04°46.757'W, 60.7m, NMW.Z.2003.048.5; **3 spec.** Carmarthen Bay (OBC survey), Stn 134A, 51°28.161'N 04°51.471'W, 53.8m, NMW.Z.2003.048.6; **1 spec.** Carmarthen Bay (OBC survey), Stn 144A, 51°26.628'N 04°52.319'W, 59.0m, NMW.Z.2003.048.7; **3 spec.** Carmarthen Bay (OBC survey), Stn 144 B, 51°26.628'N 04°52.319'W, 59.0m, NMW.Z.2003.048.8.

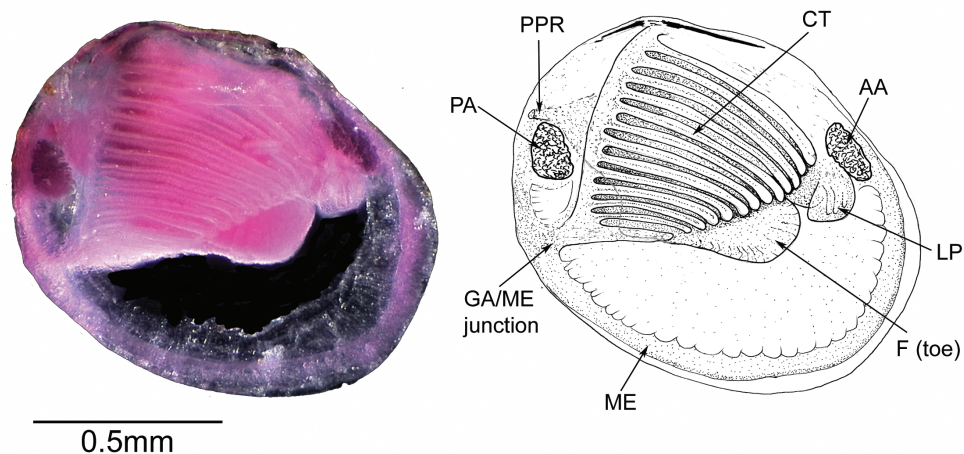
*Measurements* Lectotype L 2.69mm, H 1.81mm; Paralectotype L 1.69mm, H 1.31mm.

*Shell* (Figs 9-13a) Length to 2.7mm, relatively flattened, equivalve, strongly inequilateral, beaks in the posterior two-thirds of the shell. Umbos prominent, rounded. Outline obliquely subovate, transversely tear-drop in form. Dorsal-anterior (lunule) margin prominent, straight, gently sloping, slightly angled at junction with anterior margin; lunule elongate, narrow, not sunken but defined by a weak ridge. Anterior margin rounded; ventral margin gently curved; posterior margin subtruncate, junctions with ventral and posterior dorsal margins weakly angulate; posterior dorsal margin short, straight to slightly convex, steeply angled.

Ligament large, internal, on a shallow resilifer, slightly posterior to the beaks. Hinge in right valve with single anterior and posterior lateral



**Figs 14-16** *Coracuta obliquata* n.gen., Carmarthen Bay, NMW.Z.2003.048.3 **Figs 14, 14a** left valve and detail of hinge **Figs 15, 15a** right valve and detail of hinge **Fig 16** external of right valve.



**Figs 17a, b** *Coracuta obliquata* n.gen. , Gross anatomy after removal of shell and right mantle, photograph after staining in Rose Bengal, Carmarthen Bay, NMW.Z.2003.048.

**AA** anterior adductor; **CT** ctenidium, **F(toe)** toe of foot, **GA/ME junction** of gill axis and mantle edge, **LP** labial palps, **ME** mantle edge, **PA** posterior adductor, **PPR** posterior pedal retractor.

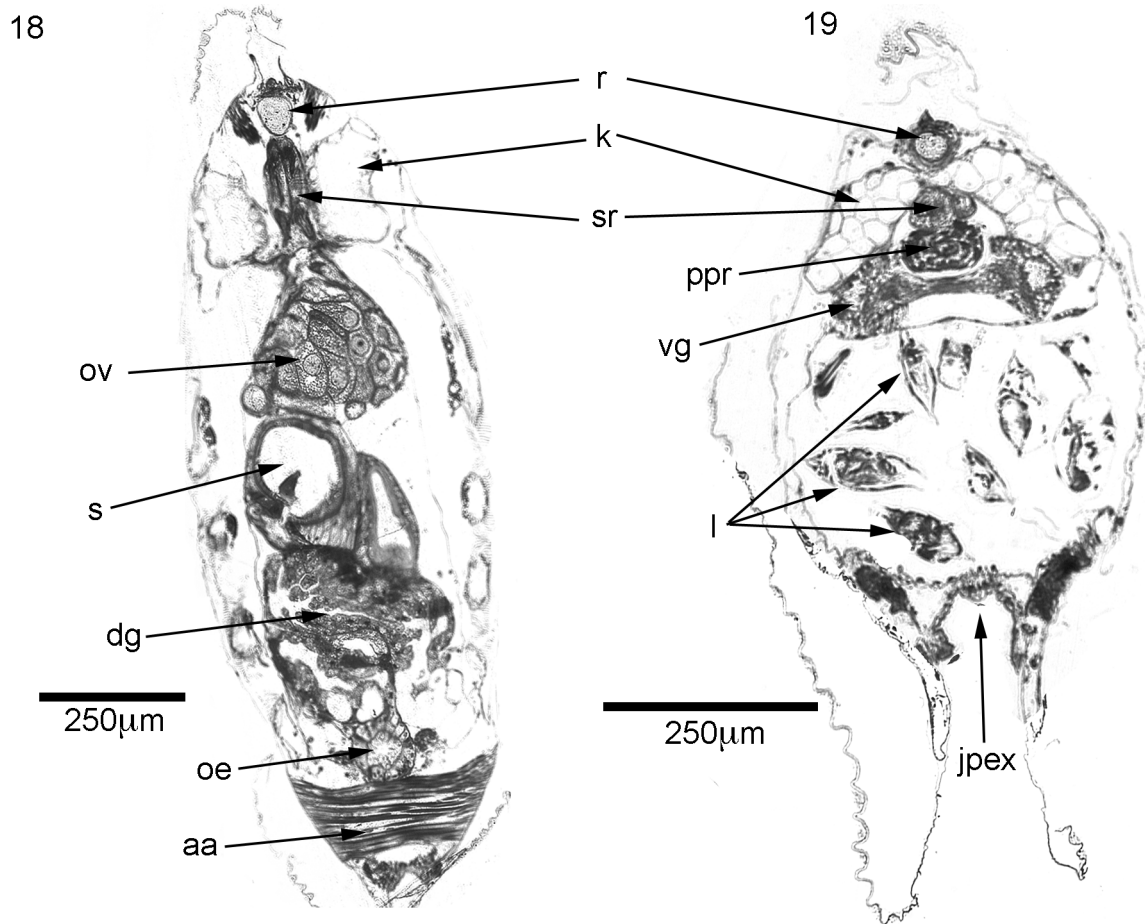
teeth; anterior lateral longer than posterior at a ratio of 2.7:1, parallel and equal to the length of the lunule margin, which creates a shelf to form a socket; posterior lateral short subparallel to dorsal margin and forming a small v-shaped socket at its posterior extremity.

Left valve (Figs 14, 14a) without lateral teeth but dorsal margins slightly extended as marginal flanges that fit into right valve sockets. A small

tubercle is present beneath and slightly to the anterior of the beak.

The prodissoconch (Fig. 16) is smooth, bearing no sculpture and there is a suggestion of a PdI at 79µm in length; PdII is 344µm.

Sculpture (Fig. 16) concentric, of fine, sharp, concentric ridges these irregularly undulating and occasionally dichotomizing. Shell colour cream to very light brown, glossy.



**Fig. 18** *Coracuta obliquata* n. gen., transverse section, Carmarthen Bay. **K** kidney, **R** rectum, **SR** seminal receptacles, **PPR** posterior pedal retractor, **VG** visceral ganglion, **L** larvae, **P** periostracum, **MM** mantle margin. **Fig. 19** *Coracuta obliquata* n. gen., longitudinal section, Carmarthen Bay. **AA** anterior adductor, **DG** digestive gland, **I** intestine, **O** ovary, **OE** oesophagus, **PA** posterior adductor, **SR** receptacles & duct opening.

**Anatomy** (Fig. 17) Mantle edge un-fused except at junction with gill axis. Ctenidium of single demibranchs only, filaments reflexed. Labial palps small with a prominent oral fold. Foot axe shaped. Adductor muscles of equal size, anterior oval, posterior subcircular. Females with paired seminal receptacles. Eggs brooded to larval stage.

**Habitat** In the Bristol Channel living specimens were collected from between 50 to 60m water depth and from a variety of substrate types (Table 1). Sediments were typically sandy but with varying amounts of mud and gravel. Off the Iberian coast (Salas, 1996) *C. obliquata* has been collected in depths of 22-60m in gravel, mud, muddy sand and gravel and rocks. In the Mediterranean (Kallonas et al., 1999) the species was recorded at depths of 4-85m in sandy mud and silt.

**Geographical distribution** In the Atlantic Ocean it is known from off northern and western Ireland, the Bristol Channel (this paper) and the Alboran Sea (South Iberia off Cadiz and off Huelva) (Salas, 1996). In the Mediterranean from the Tyrrhenian, Ligurian, Adriatic, Ionian and Aegean Seas (Kallonas et al, 1999; Monterosato, 1875).

The lack of records in the UK could be explained by the very small size of *C. obliquata* and probably sporadic distribution as evidenced in the Outer Bristol Channel. Tebble (1976) mentioned the Rathlin Island record but considered it a 'doubtful British record' although Smith and Heppell (1991) did include it in their checklist. The similarity of *C. obliquata* to *Mysella bidentata* juveniles could have lead to misidentifications in the past as our samples contained both species.

**Table 1** Sediment characterisation for stations at which *Coracuta obliquata* was found in the Bristol Channel

Station	% sand	% mud	% gravel	SUM
55	93.62	5.79	0.59	Sandy
96	72.28	26.82	0.9	Muddy sand
97	63.75	16.89	19.36	Muddy gravelly sand
98	41.9	1.14	56.96	Sandy gravel
134	95.11	2.98	1.91	Sandy
144	96.03	3.97	0	Sandy

## ECOLOGY

The Galeommatoidea and in particular the Montacutidae are known to have strong associations with other marine invertebrates. This can be a precise commensal relationship such as between *Montacuta substriata* and the echinoid *Spatangus* (Tebble, 1966) and *Montacutona mutsuwanensis* and the Cnidarian *Cerianthus filiformis* and phoronid *Phoronis australis* (Morton & Scott, 1989; Morton, 1989) or may be less restricted such as the association of '*Mysella*' *bidentata* with both ophiuroids and sipunculans (Ockelmann & Muus, 1978). The taxonomic range of associates is wide, frequently with echinoderms and sipunculans but also with polychaetes, phoronids, crustaceans and cnidarians (Morton & Scott, 1989).

We have no direct evidence of an association between *Coracuta obliquata* and any invertebrate but the extensive community data from the Outer Bristol Channel survey (Mackie *et al.*, in press) allows us to look for possible associations. *Coracuta obliquata* was found at only six of the 148 stations sampled and these six are geographically clustered. From analysis of the overall faunal assemblages, all but one of these stations is represented by community IId (Mackie *et al.*, in prep). On analysis of the molluscs alone, all our stations group together in a single community. This total fauna assemblage clusters geographically and the five stations are in the southern, deeper half of the area occupied by community IId. Some 320 species were recorded from this community with the top ten dominant being *Scalibregma inflatum*, *Spiophanes bombyx*, *Ampharete lindstroemi*, *Abra alba*, *Lagis koreni*, *Mysella bidentata*, *Mediomastus fragilis*, *Phoronis* spp indet., *Ampharete* sp. and *Ampelisca spinipes*

(in descending order of dominance). Polychaetes dominate the community, which also contains a phoronid, an amphopod and two bivalve species. Trawl samples in the area recorded large numbers of brittle stars - *Ophiura albida* and *O. ophiura* - and the bristle worm *Aphrodita aculeata*. There are a number of possible associates within this assemblage list including ophiuroids, phoronids, polychaetes and crustaceans. A cluster analysis of all species and all stations using R mode shows *C. obliquata* clustering at 34% with *Ophiura ophiura* and *Eudorella truncatula* (Cumacean). Sixty percent of the distribution of *O. ophiura* is found in another 2 communities as well as IId. *Eudorella truncatula* is found most frequently in community IId, although two of its stations overlap with an adjacent community. *Amphiura filiformis* is found at all six of our *C. obliquata* stations along with *Mysella bidentata* but both are found throughout all four communities and are known to be associated with each other. No one species stands out from the analysis as a certain associate and until further studies are carried out it is still unknown as to whether or not *C. obliquata* has any symbiotic association.

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## REFERENCES

- AARTSEN VAN JJ 1996a Galeommatacea and Cyamiacea. *La Conchiglia* **279**: 31-36.
- AARTSEN VAN JJ 1996b Galeommatacea and Cyamiacea Part II. *La Conchiglia* **281**: 27-53.
- ANGAS GF 1877 Descriptions of one genus and twenty-five species of marine shells from New South Wales. *Proceedings of the Zoological Society of London* **1877**: 171-77, pl. 26.
- CARROZZA F 1983 Microdoride di malacologia Mediterranea. *Bolletino Malacologico* **19**(1-4) 65-70.
- CHASTER GW 1897 III Notes on the marine mollusca of Rathlin Island. *The Irish Naturalist* **1897**: 184-187.
- CIANFANELLI S & TALENTI E 1987 Ulteriori conoscenze sulla Malacofauna del Golfo di Baratti (Piombino Li). *Bolletino Malacologico* **23** (5-8): 263-268.
- CLEMAM 2005 Taxonomic Database on European Marine Mollusca ([www.somali.asso.fr/clemam/index.php](http://www.somali.asso.fr/clemam/index.php)).
- COAN EV, SCOTT PV & BERNARD FR 2000 *Bivalve Seashells of Western North America*. Santa Barbara Museum of Natural History, Santa Barbara 764pp.
- JEFFREYS JG 1859 Further gleanings in British Conchology. *Annals and Magazine of Natural History* (3) **3**: 30-43, 106-120.
- JESPERSEN A & LÜTZEN J 2000 Sex, seminal receptacles, and sperm ultrastructure in the commensal bivalve *Montacuta phascalionis* (Veneroidea; Galeommatacea). *Acta Zoologica* (Stockholm) **81**: 69-75.
- KALLONAS M, ZENETOS A & GOFAS S 1999 Notes on the Ecology and Distribution of Microbivalvia in Greek Waters. *La Conchiglia* **291**: 11-20.
- MACKIE ASY, JAMES JWC, REES EIS, DARBYSHIRE T, PHILPOTT SL, MORTIMER K, JENKINS GO & MORANDO A (In press) *The Outer Bristol Channel Marine Habitat Study. Studies in Marine Biodiversity and Systematics from the National Museum Wales. BIOMÔR Reports 4*. ISBN 0-7200-0569-8.
- MONTEROSATO M DE 1875 Conchiglie Mediterranee. *Atti Accademia di Scienze ed Arti Palermo* n ser. Vol v pp 1-50.
- MORTON B 1989 *Partnerships in the Sea: Hong Kong's Marine Symbioses*. Hong Kong University Press, Hong Kong 124pp.
- MORTON B & SCOTT PH 1989 The Hong Kong Galeommatacea (Mollusca: Bivalvia) and their hosts, with descriptions of new species. *Asian Marine Biology* **6**: 129-160.
- OCKELMANN KW & MUUS K 1978 The Biology, ecology and behaviour of the bivalve *Mysella bidentata* (Montagu). *Ophelia* **17**(1): 1-93.
- SALAS C 1996 Marine Bivalves from off the Southern Iberian Peninsula collected by the Balgim and Fauna 1 expeditions. *Haliotis* **25**: 33-100.
- SCOTT PV 1998 Bivalvia. In P.V. Scott & J.A. Blake (eds) *Taxonomic Atlas of the Benthic fauna of the Santa Maria Basin and the Western Santa Barbara Channel*. Santa Barbara Museum of Natural History, Santa Barbara pp. 97-174.
- SMITH S & HEPPELL D 1991 *Checklist of British Marine Mollusca*. National Museums of Scotland Information Series No 11. 114pp.
- TEBBLE N 1976 *British Bivalve Seashells* HMSO, Edinburgh 2<sup>nd</sup> edition 212pp.
- VELAIN CH 1878 *Remarques sur la fauna des Iles Saint-Paul et Amsterdam, suivies d'une description des mollusques testacés de ces deux îles*. A. Hennuyes, Paris 143pp, 5 pls.
- YOKOYAMA M 1922 Fossils from the Upper Musashino of Kazusa and Shimosa. *Journal of the College of Science, Imperial University Tokyo* **44**(1): 1-200pp, 17pls.