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Article

Additional records of marine bivalves from Iraq, with a provisional checklist for the marine bivalves of Iraq

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Abstract
Specimens of four species of Bivalvia not previously recorded from Iraq were discovered. These are *Didimacar tenebrica*, *Aspidopholas obtecta*, *Neotrapezium sublaevigatum*, and *Barbatia trapezina* which belong to the Noetiidae, Pholadidae, Trapezidae and Arcidae families, respectively. All specimens were collected alive from the intertidal zone of the northwest Persian-Arabian Gulf, Iraq, in the Fao region. Although these species are widespread in the Persian-Arabian Gulf, our study is the first to report them along the Iraqi coast. A provisional checklist of marine bivalves of Iraq is presented listing 32 species of which 21 have been verified from specimens or photographs. This list is compared with data from adjacent coasts of Kuwait and Iran.

Key words: Fao region, Molluscs, Persian-Arabian Gulf.

Introduction

Checklists are a useful way of gathering biodiversity data that are essential to the monitoring and management of biological resources (Gofas *et al*., 2017). The Mollusca are an important part of global biodiversity making up to 25% of the marine benthic fauna (Appeltans, 2012). The Bivalvia are present in both marine and freshwater environments and as filter or deposit feeders play an important role in ecosystem functioning (Vaughn & Hoellein, 2018). Bivalves also serve as bioindicators of pollution or stress in the environment (López-Rojas *et al*., 2020).

The marine Mollusca of Iraq are poorly studied with the most recent being a checklist of marine gastropods (Yasser & Naser, 2021) in which 34 species are recorded. No recent equivalent list for the Bivalvia is available but a few species were recorded by Ahmed (1975), and Al-Hassan & Al-Hasani (1985). Ahmed (1975) listed 14 marine species of bivalves, while Al-Hassan & Al-Hasani listed 14 species of bivalves. Only one taxon is common to both lists giving a total of 27 nominal taxa. Five further species were recorded from the newly discovered coral reef to the south-west of the Iraq coast but in Iraqi waters (Ali et

al, 2017). Even if these nominal taxa represented individual species the diversity is much lower than recorded from neighbouring Kuwait where Al-Kandari *et al*. (2020) listed 100 living species belonging to 33 families. Al-Kandari & Oliver (in prep) taking into account species recorded as dead shells they illustrate 202 species. The current lists are also less diverse than for the adjacent region in Iran where Papahn & Ghajari (2018) list 57 nominal bivalve taxa.

However, recent industrial scale creation of breakwaters has introduced many kilometres of rock substrate which will attract both epifaunal and perhaps rock boring bivalves.

Also relevant to the Iraqi fauna are the studies on the post-Pleistocene Hamar Formation near Basrah, which has been shown to be of relatively recent deposition and carrying numerous marine molluscs (Eames & Wilkins, 1957) and (Dance & Eames, 1966)

This paper presents a number of species not previously recorded from Iraq along with a preliminary checklist of the marine Bivalvia of Iraq.

Material and Methods

Specimens of *D. tenebrica*, *A. obtecta*, *N. sublaevigatum*, and *B. trapezina* were collected from the Fao region Iraq of the north west of the Persian-Arabian Gulf at 29.898430°N, 48.499663°E on 18 November 2021, on rocks. The specimens are preserved in 70% ethanol and deposited in the Marine Science Centre (MSC), with collection voucher numbers (205, 206, 207and 208), University of Basrah, Iraq. Provisional identifications were made following Oliver in Dance *et al*. (1995) with the nomenclature and classification following MolluscaBase.

The checklist includes specimens collected by us as well as species recorded in literature. Records made by us and those verified from the literature are marked with a **V**; those not verified by us but are plausible are marked with a **P**; some that cannot be verified but are not plausible are rejected and marked with an **R**. Plausible species are those that have been recorded from adjacent countries of Kuwait and Iran. In addition, the superscript **H** denotes species that live on hard ground such as rock and coral and the superscript **S** for species that burrow into muds and sands.

Results

Noetiidae Stewart, 1930
Didimacar Iredale, 1939

Didimacar tenebrica (Reeve, 1844)
(Fig. 1A)

Material examined: 1 specimen, length= 12.88 mm, (MSC:205).

Shell description

Shell small, with subrectangular, rounded corners and beaks in the front part. Fine concentric lines are interspersed with radial riblets on the outer surface. Primary riblets interspersed with secondary riblets in two rows of radial riblets. Ligament behind the beaks. Periostracum is a dark brown.

Habitat: Living under stones, on the lower beach, and below.

Distribution: NWG (Fig. 3).

Pholadidae Lamarck, 1809
Aspidopholas P.Fischer, 1887

Aspidopholas obtecta (Sowerby, 1849)
(Fig. 1 B; Fig. 2 A)

Material examined: 1 specimen, length= 22.46 mm, (MSC:206).

Shell description

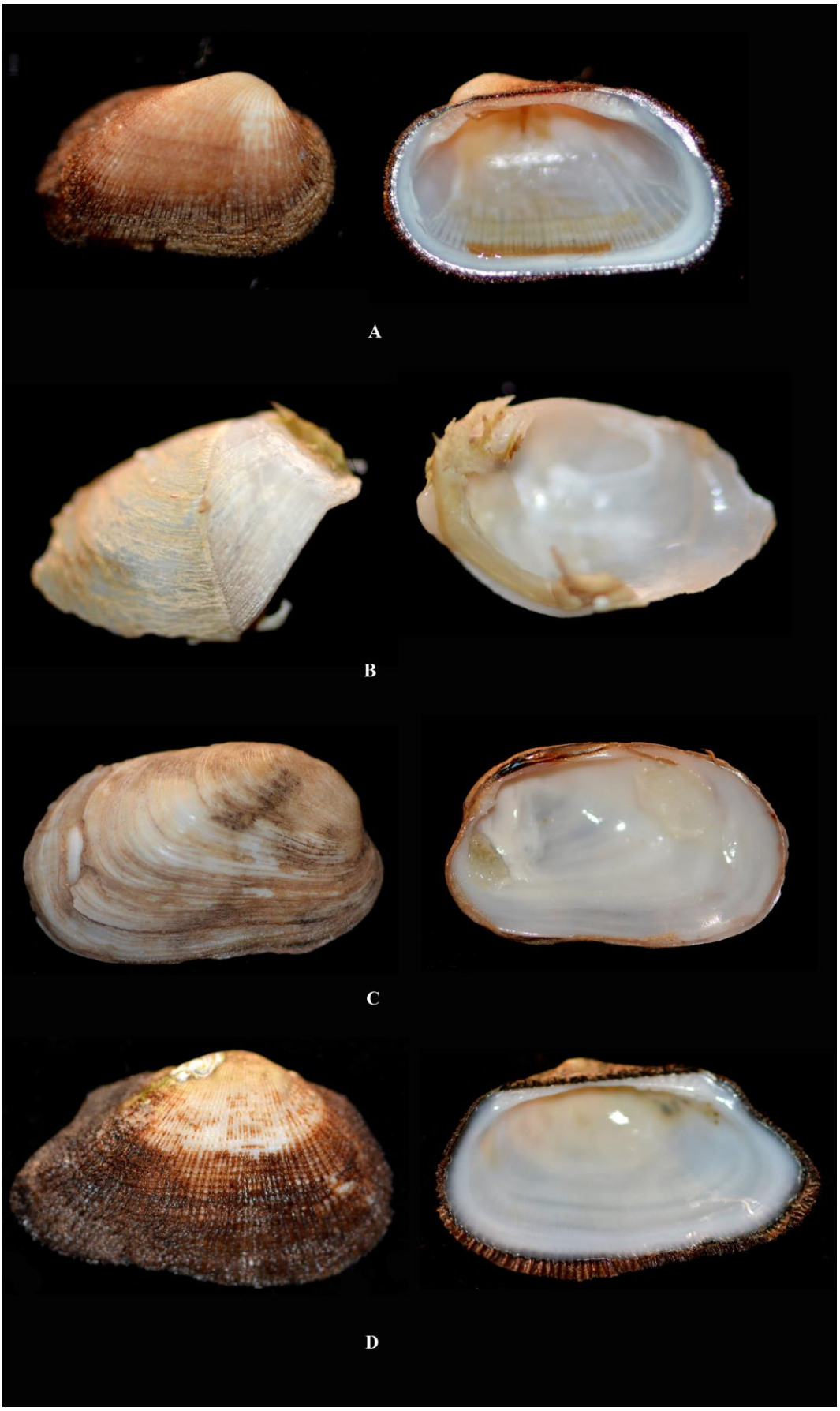

Figure 1. Marine bivalves from the Iraqi coast: A, *Didimacar tenebrica*, B, *Aspidopholas obtecta*, C, *Neotrapezium sublaevigatum*, and D, *Barbatia trapezina*.

Shell is elliptical in shape and considerably inflated. Beaks are much forward of the midline. Subovate, broadest across the umbones, tapering posteriorly and irregularly here, bulbous anteriorly. external sculpture of four zones; medial zones divided by narrow sulcus. Shell with median furrow, serrated concentric ridges in the front, concentric lines in the back, and these receding on the posterior calcareous extension (siphonoplax).

Habitat: in sandstone, lower shore and bellow.

Distribution: NWG, GO, SO (Fig. 3).

Trapezidae Lamy, 1920 (1895)

Neotrapezium Habe, 1951

Neotrapezium sublaevigatum (Lamarck, 1819)
(Fig. 1C)

Material examined: 4 specimen , length= 33.89 mm, (MSC:207).

Shell description

Shell is thin but solid, and it is usually compressed. Beaks are subterminal and close to the front end. Subrectangular, virtually modioliform in shape, with a narrowly rounded anterior and a subtruncate or widely rounded posterior. Sculpture of irregular, coarse concentric lines and incremental grooves, with indications of radial striae in the umbonal region. Internally, dirty white with subtle brown patterns, with brown or purple tinges.

Habitat: attached to rocks usually in the vicinity of mangroves, intertidal.

Distribution: NGW, SEG, GO (Fig. 3).

Figure 2. Habitats of marine bivalves from the Iraqi coast: A, *Aspidopholas obtecta* and B, *Barbatia trapezina*.

Arcidae Lamarck, 1809
Barbatia Gray, 1842

Barbatia trapezina (Lamarck, 1819)
(Fig. 1 D; Fig. 2 B)

Material examined: 3 specimen, length= 58.65 mm, (MSC:208).

Shell description

Beaks that are about a quarter of the length of the anterior border. Trapezoidal outline; posterior margin sloping, almost straight, forming an angled posterior ventral junction; anterior margin rounded, more vertical. The median sulcus is flat to slightly concave, with a weak byssal sinus. Numerous riblets are intersected by an equal number of weaker commarginal grooves, giving the sculpture a subcancellate look.

Habitat: found on intertidal to offshore stones. Indo-Pacific including the Arabian/Persian Gulf and Arabian Sea.

Note: Species of *Barbatia* can be difficult to identify, especially those of the *B. foliata* complex. The distinction between *B. foliata*, *B. decussata* and *B. trapezina* was made by Aguerra & Oliver, 2008.

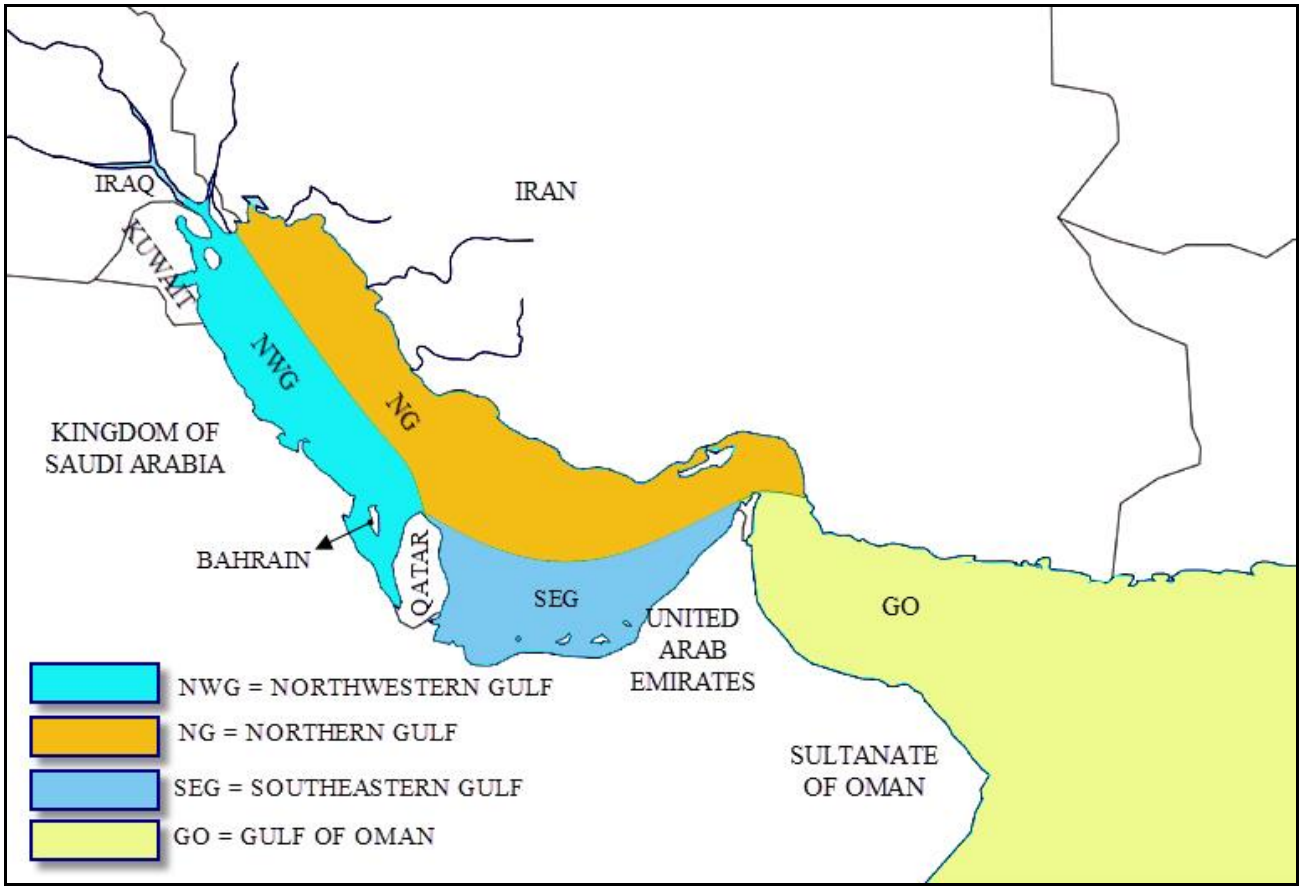

Figure 3. Distribution of marine bivalves in the Persian-Arabian Gulf.

Revised Checklist

Mytilidae Rafinesque, 1815
Brachidontes pharaonis (P. Fischer, 1870)[V, H]
Brachidontes variabilis (Krauss, 1848) –Ahmed (1975: 31, fig. 37 a, b)
Lithophaga robusta (Jousseaume, 1919) [V, H boring into corals]
Lithophaga robusta (Jousseaume, 1919) – Ali *et al*. (2017, Fig. 3)

Arcidae Lamarck, 1809
Barbatia trapezina (Lamarck, 1819) this paper[V, H]
Barbatia decussata (Sowerby, 1833) – Ali *et al*. (2017, Fig. 3)
Anadara sp indet (= *Anadara* sp., Al-Kandari *et al*., 2020, pl. 3 fig. h)[V, S]
Arca holoserica Reeve, 1843 Ahmed (1975: 29, fig. 34 a, b)
Arca uropigimelana Bory de Saint-Vincent, 1827 Ahmed (1975: 30, fig. 36 a, b)
Anadara antiquata (Linnaeus, 1758) – Al-Hassan & Al-Hasani (1985)[R]
Probably *Anadara* sp. indet as *A. antiquata* is not known from the northern Gulf.

Noetiidae Stewart, 1930
Didimacar tenebrica (Reeve, 1844) – Present study [V, H]
Congetia chesneyi (Oliver & Chesney, 1994) [V, S]
Arca foliata Forsskål in Niebuhr, 1775 – Ahmed (1975: 30, fig. 35 a, b)
Striarca sculptilis (Reeve, 1857) – Al-Hassan & Al-Hasani (1985) [R]
Probably *Didimacar tenebrica*, The name *S. sculptilis* is used by Jones (1986) but his illustration suggests *D. tenebrica*.

Margaritidae Blainville, 1824
Pinctada imbricata radiata (Leach, 1814)[P, H]
Pinctada radiata (Leach, 1814) –Al-Hassan and Al-Hasani (1985)

Pteriidae Gray, 1847 (1820)
Pteria sp.[P, H] attached to whip corals in sublittoral
Pteria marmorata Reeve – Al-Hassan & Al-Hasani (1985)
Pteria marmorata Reeve is a junior synonym of *P. hirundo* (Linnaeus, 1758) a North Atlanic/Mediterranean species that has never been recorded from the Indian Ocean.

Malleidae Lamarck, 1818
Malleus Lamarck, 1799
Malleus regula (Forsskål in Niebuhr, 1775) [P, H]
Malleus regulus [sic] – Al-Hassan & Al-Hasani (1985)
Malvufindus normalis (Lamarck, 1819) – Ali *et al*. (2017, Fig. 3[R])
This record is rejected as that species has never been recorded from the Arabian Gulf and we are unable to make an alternative identification.

Isognomonidae Woodring, 1925 (1828)
Isognomon legumen (Gmelin, 1791) [P, H]
Isognomon legumen (Gmelin, 1791) – Al-Hassan & Al-Hasani (1985)

Pinnidae Leach, 1819
Pinna bicolor (Gmelin, 1791)[V, S]
Pinna muricata Linnaeus, 1758 – Al-Hassan & Al-Hasani (1985)
Pinna bicolor (Gmelin, 1791) – Ali *et al*. (2017, Fig. 3)

Pectinidae Rafinesque, 1815
Azumapecten ruschenbergerii (Tryon, 1869) [V, H]
Chlamys livida (Lamarck, 1891 (sic 1819) – Ali *et al*. (2017, Fig. 3)

Spondylidae Gray, 1826
Spondylus costatus Lamarck, 1819 – Ahmed (1975: 31, fig. 38 a, b)[R]
Spondylus costatus is a junior synonym of *S. foliaceus* Schreibers, 1793 and according to Huber (2010) this is an Australian/Japanese species and therefore unlikely to occur in the norther Gulf. We are unable to confirm the identity from the figure in Ahmed (1975) but suspect it is *S. spinosus* Schreibers, 1793 that is common in Kuwait (Al Kandari *et al*., 2020) and include that species here.
Spondylus spinosus Schreibers, 1793 – Ahmed (1975: 31, fig. 38 a, b)[P, H]

Ostreidae Rafinesque, 1815
Saccostrea cucullata (Born, 1778)
Crassostrea cucullata (Born, 1778) – Ahmed (1975: 32, fig. 40 a, b) [P, H]
Given the recent discovery of the previously undescribed oyster *Talonostrea salpinx* (Oliver *et al*. in Al-Kandari *et al*. (2021) that is abundant in Khor Subiya (Kuwait) and in Bandar Imam Khomeni (Iran) we might expect it to occur in Iraq. From the figure in Ahmed (1975) we cannot conclusively identify the figured shells.

Placunidae Rafinesque, 1815
Placuna [Lightfoot], 1786
Placuna placenta (Linnaeus, 1758) [V, S]
Placuna placenta (Linnaeus, 1758) – Ahmed (1975: 32, fig. 39 a, b)
Placuna placenta (Linnaeus, 1758) – Al-Hassan & Al-Hasani (1985)

Condylocardiidae F. Bernard, 1896
Carditopsis coxi (Eames & Wilkins, 1957) [V, S]
Cuna coxi Eames & Wilkins, 1957: 199, Plate 27, figs 1-3.

Solenidae Lamarck, 1809
Solen dactylus Cosel, 1989 [V, S]
Solen vagina Linnaeus, 1758 –Ahmed (1975: 37, fig. 50a, b)
The anterior groove distinguishes this species from *S. vagina*.

Cardiidae Lamarck, 1809
Vasticardium assimile lacunosum (Reeve, 1845) [V, S]
Laevicardium flavum (Linnaeus, 1758) – Ahmed (1975: 34, fig. 45 a, b)
Vasticardium elongatum enode (G. B. Sowerby II, 1840) [R]
Trachycardium enode (G. B. Sowerby II, 1840) – Al-Hassan & Al-Hasani (1985)
This species has not been recorded elsewhere in the Gulf and we suspect it to be a misidentification of the common *V. a. lacunosum.*

Tellinidae Blainville, 1814
Macoma jeanae Dance & Eames, 1966 [V, S]
Macoma jeanae Dance & Eames, 1966:36-37, pl. 4, figs 1-2.
This species was described from the Hamar formation in Iraq but is missing from MolluscaBase (2022)
Iraqitellina iraqensis **Dance & Eames, 1966** [V, S]
Iraqitellina iraqensis Dance & Eames, 1966:37-38, pl. 3, figs 2-3.
This species was described from the Hamar formation and according to Huber (2015) it is a junior synonym of *Tellinangulus aethiopicas* (Thiele, 1931) from the central Indian Ocean; we doubt this and retain the original designation.
Jitlada cf. arsinoensis (Issel, 1869) [P, S]
Angulus sp. – Ahmed (1975: 38, fig. 53 a, b)
Pseudopsammobia sp. [V, S]
Mactra sp. – Ahmed (1975: 39, fig. 54 a, b)
This shell is not uncommonly found as dead shells on the shores of Bubyan, Miskan and Failaka (Kuwait) and has been likened to Pseudopsammobia simplex (Sowerby, 1894) from Hong Kong. Current research is underway to establish if it a widespread Indo-Pacific species or one restricted to Arabian waters (Oliver in prep)

Psammobiidae J. Fleming, 1828
Gari Schumacher, 1817
Gari occidens (Gmelin, 1791) [P, S]
Gari occidens (Gmelin, 1791) –Al-Hassan & Al-Hasani (1985)

Semelidae Stoliczka, 1870 (1825)
Theora H & A Adams, 1856
Theora mesopotamica (Annandale, 1918)[V, S]
Abra cadabra Eames & Wilkins, 1957: 199-200, pl. 27. figs. 4–5.
Abra cadabra Eames & Wilkins, 1957 – Ahmed (1975: 36, fig. 49 a, b)

Mactridae Lamarck, 1809
Mactra lilacea Lamarck, 1818[V, S]
Mactra dissimilis Reeve, 1854 – Ahmed (1975: 37, fig. 51 a, b)
According to Huber (2010) *M. dissimilis* is an Indo-West Pacific species never recorded from the Arabian region. The figure in Ahmed (1975) is sufficient to regard it as the common Gulf species, *M. lilacea.*

Trapezidae Lamy, 1920 (1895)
Neotrapezium sublaevigatum (Lamarck, 1819) –Present study [V, H]

Veneridae Rafinesque, 1815
Timoclea arakana (Nevill & Nevill, 1871)[V, S]
Timoclea macfadyeni Dance & Eames, 1966: 35-36, Pl. 2 figs 1-2, pl. 3, fig. 1.
Pelecyora katiawarensis (Fischer-Piette & Métivier, 1971) [V, S]
Dosinia laminata (Reeve, 1850) – Ahmed (1975: 35, fig. 47 a, b).
This is a very common species living in intertidal muddy-sand throughout Kuwait Bay (Al-Kandari *et al*., 2020) but was identified as *P. ceylonica* (Dunker, 1865). Recent research by Oliver (in prep) now shows that the northern Gulf shells are closer to P. *katiawarensis* a s species known from NW India and Pakistan.
Callista umbonella (Lamarck, 1818)[V, S]
Macrocallista umbonella – Ahmed (1975: 35, fig. 46 a, b)
Marcia cordata (Forsskål in Niebuhr, 1775)[P, S]
Marcia hiantina (Lamarck, 1818) – Al-Hassan & Al-Hasani (1985)
Much confusion has centred on species of *Marcia* in the Western India Ocean and Arabian Seas but only a single species, *M. cordata* was recorded by Al-Kandari *et al*. (2020) in Kuwait. Huber (2010) considers *M. hiantina* to have a Indo-West Pacific distribution.
Protapes ziczac (Linnaeus, 1758)[P, S]
Paphia gallus – Al-Hassan & Al-Hasani (1985)
Protapes gallus is a south Indian species (Arathi *et al*., 2018) and is replaced in the Arabian region by *P. ziczac.* Oliver & Glover (1996) did not recognise that *P. sinuosa* as a synonym of *P. ziczac* but did describe another species *P. rhamphodes* Oliver & Glover, 1996 that is common on intertidal sand flats in the Arabian Gulf
Periglypta reticulata (Linnaeus, 1758) [P, S]
Periglypta reticulata (Linnaeus, 1758) – Al-Hassan & Al-Hasani (1985)
Placamen lamellatum (Röding, 1798) [P, S]
Bassina calophylla (Philippi, 1836) – Al-Hassan & Al-Hasani (1985)

Pholadidae Lamarck, 1809
Aspidopholas obtecta (Sowerby, 1849) –Present study [V,H]

Discussion

Species diversity

The revised checklist now includes 21 verified species and a further 12 plausible species giving a list, if confirmed, of 32 species. The majority are inhabitants of soft sediments as would be expected for the predominance of this shore type in Iraq. The expanses of soft sediments and shallow water are typical of Khor Abdullah and Khor Saka and are shared with the Kuwait islands of Bubyan and Warbah. Similar shallow soft sediments are also present in the large Iranian bay leading to Bandar Imam Khomeni. The Iranian list by Papahn & Ghajari (2018) gives 57 nominal bivalve taxa and the number of species recorded on the south coast of Bubyan and in Khor Subiya is 51 (Al-Kandari & Oliver in prep). The discrepancy in

diversity of these neighbouring sites is probably due to the different availability of habitats. The Iranian survey included exposed sites on the coast to the east and west of the shallow bay resulting in more hard ground species being recorded than found in Iraq. The south coast of Bubyan is an expanse of homogenous soft sediments whereas in Khor Al-Subiya there are exposures of beach rock, oyster reefs and at its mouth more sandy compacted sediments.

However, a number of species recorded mostly as dead shells from South Bubyan (Al-Kandari & Oliver, in prep) have not been recorded in Khor Abdullah. Many of these are large and doubtfully overlooked, such as; *Solecurtus exaratus* (Philippi, 1849), *Hanleyanus immaculatus* (Philippi, 1849), *Arcopaginula inflata* (Gmelin, 1791), *Tellinimactra edentula* (Spengler, 1798), *Leporimetis coarctata* (Philippi, 1845), *Macomopsis dubia* (Deshayes, 1855), *Transkeia globosa* (Forsskål in Niebuhr, 1775), *Clementia papyracea* (Gmelin, 1791) and *Cryptomya elliptica* (A. Adams, 1851).

Some common smaller species found at Bubyan and in the Iranian Bay have also not yet been recorded from Iraq such *Ennucula layardii* (Adams, 1856), *Scissileda tropica* (Melvill, 1897) and *Corbula subquadrata* Melvill & Standen, 1907.

The apparent less diverse Iraqi fauna needs further investigation with more collecting to establish if the difference between the Iranian and Kuwaiti sites of similar ecological conditions is real or an artifact of collecting effort. Consequently, this checklist must be viewed as provisional.

Taxonomic congruence

In the methods we emphasised the need to include only verified records in any checklist or at least recognise the inclusion of taxa that have not been verified. Verification is best done from actual specimens or good quality photographs, but the latter must illustrate the key character necessary to identify to the species level. Here we were able to examine the illustrations in Ahmed, 1975 but could not verify the species listed in Al-Hassan & Al-Hasani (1985). Of the 14 species listed and illustrated by Ahmed only 5 were identified to modern standards thus emphasising the need to verify records. This observation should not be taken as criticism of Ahmed but rather an acknowledgement of the lack of taxonomic tools and poor understanding of the Gulf fauna at that time. Ahmed was helped by professional malacologists in The UK and Germany and further shows the poor state of knowledge of this region.

Further examples of the lack of taxonomic congruence can be found in the Iranian paper by Papahn & Ghajari (2018). Here too misidentifications were made through the use of names applicable to European North Atlantic species, notably *Cochlodesma praetenue* and *Tellina donacina*. These species are probably *Exolaternula erythraea* (S & N Morris, 1993) and and *Iridona methoria* (Melvill, 1897).

These findings suggest the need for further integration of studies on the marine fauna of the Gulf and the development of accessible taxonomic tools..

References

Agüera, A. & Oliver, P.G. (2008) Species discrimination in seven species of *Barbatia* (Bivalvia: Arcoidea) from Thailand with a redescription of *B. grayana* (Dunker, 1858). *The Raffles Bulletin of Zoology*, Supplement 18, 7–23.

Ahmed, M. M. (1975) Systematic study on Mollusca from Arabian Gulf and Shatt Al-Arab. Center for Arab Gulf Studies, Basrah University, Iraq. 75 pp.

Al-Hassan, L.A.J. & Al-Hasani, Z.I. (1985) New records of marine Mollusca from Khor Abdullah, Iraq. *The Nautilus*, 99 (1), 20–21.

Al-Kandari, M., Chen, W., Skryabin, V., Raghu, M., Yousif, A., Al-Jazzaf, S., Taqi, A. & AlHamad, A. (2020) Diversity and distribution of the intertidal Mollusca of the State of Kuwait, Arabian Gulf. *Regional Studies in Marine Science*, 33 (100905), 1–19. https://doi.org/10.1016/j.rsma.2019.100905

Al-Kandari, M., Oliver, P.G. & Al-Ashuaibi, A. in prep. *Atlas to the Intertidal Bivalvia of Kuwait.* Kuwait Insistute for Scientic Research, Kuwait.

Al-Kandari, M., Oliver, P.G. & Salvi, D. (2021) Molecular and morphological systematics of a new, reef forming, cupped oyster from the northern Arabian Gulf: *Talonostrea salpinx* new species. *ZooKeys*, 1043, 1–20. https://doi.org/10.3897/zookeys.1043.66992

Ali, M.H., Ahmed, H.K., Mohammed, H.H. & Al-Zwar, J.M. (2017) Five Bivalve Species from the Recently Discovered Coral Reef in the Marine Coastal Waters of Iraq. *Journal of Biology, Agriculture and Healthcare*, 7(8), 17–21.

Al-Mahdi, A.A., Abdullah, S.S., & Husain, N.A. (2009) Some features of the physical oceanography in Iraqi marine waters. *Mesopotamian Journal of Marine Sciences*, 24, 13–24.

Al-Yamani, F. (2008) Importance of the freshwater influx from the Shatt-Al-Arab River on the Gulf marine environment. In Protecting the Gulf's marine ecosystems from pollution. Birkhäuser Basel, pp. 207–222

Appeltans, W., Ahyong, S.T., Anderson, G., et al (2012) The mag- nitude of global marine species diversity. *Current Biology*, 22, 2189–2202.

Arathi, A.R., Oliver, P.G., Ravinesh, R. & Kumar, A.B. (2018) The Ashtamudi Lake short-neck clam: re-assigned to the genus *Marcia* H. Adams & A. Adams, 1857 (Bivalvia, Veneridae). *ZooKeys*, 799, 1–20. https://doi.org/10.3897/zookeys.799.25829

Dance, S.P. & Eames, F.E. (1966) New molluscs from the Recent Hammar formation of south-east Iraq. *Proceedings of the Malacological Society of London*, 31, 35–43.

Eames, F.E. & Wilkins, G.L. (1957) Six new molluscan species from the alluvium of Lake Hamar near Basra, Iraq. *Proceedings of the Malacological Society of London*, 32 (5), 198–203.

Evans, M.I. (1994) Important Bird Areas in the Middle East. BirdLife Conservation Series No. 2.Cambridge, United Kingdom: BirdLife International.

Gofas, S., Luque, Ángel, A., Templado, J. & Salas, C. (2017) A national checklist of marine Mollusca in Spanish waters. *Scientia Marina*, 81(2), 241–254. https://doi.org/10.3989/scimar.04543.21A

Huber, M. (2010) Compendium of bivalves. A full-color guide to 3,300 of the world's marine bivalves. A status on Bivalvia after 250 years of research. Hackenheim: ConchBooks. 901 pp., 1 CD-ROM.

Jones, D.A. (1986) A Field Guide to the Seashores of Kuwait and the Arabian Gulf. University of Kuwait & Blandford Press, p. 192.

López-Rojas, V.I., Flores-Garza, R., García-Ibáñez, S., Ruiz-Campos, G., Flores-Rodríguez, P., Violante-González, J. & Torreblanca-Ramírez, C. (2020) New records of bivalves in the Mexican Pacific Transitional Zone. *Biodiversity*, 21(3), 150–164.

MolluscaBase eds. (2022) MolluscaBase. Accessed at https://www.molluscabase.org on 2022-03-04. https://doi.org/10.14284/448

Oliver, P.G**.** & Glover, E. (1996) *Paphia (Protapes)* (Bivlavia: Veneroidea) in the Arabian Sea, with the description of a new species. *Journal of Conchology*, 35, 389–405

Oliver, P.G. (1995) Bivalvia. *In*: Dance, S.P. (Ed.) *Seashells of Eastern Arabia*. Motivate, Dubai, pp. 195–281.

Papahn, F. & Ghajari, T. (2018) Identification and classification of Bivalvia in Northwestern of the Persian Gulf coastal water (from Deylam to Bahmanshir river). *Experimental animal Biology*, 6(4), 41–55.

Vaughn, C.C. & Hoellein, T.J. (2018) Bivalve impacts in freshwater and marine ecosystems. *Annual Review of Ecology, Evolution, and Systematics*, 49(1), 183–208.

Yasser, A. & Naser, M. (2021) *Pupa affinis* (Gastropoda: Acteonidae) newly recorded from Iraq, with an updated checklist for the marine gastropods from the Iraqi coast. *Journal of Animal Diversity*, 3(2), 76–80.