

A REDESCRIPTION OF *PSEUDOPSAMMOBIA SIMPLEX* (GB SOWERBY III, 1894) [BIVALVIA: TELLINIDAE] AND THE INTRODUCTION OF A NEW SPECIES FROM THE ARABIAN REGION, *PSEUDOPSAMMOBIA DERELICTA* SP. NOV.

P. GRAHAM OLIVER¹, HENK DEKKER² & MANAL AL-KANDARI³

¹Honorary Research Fellow, National Museum of Wales, Cardiff, Wales, UK.

²Associate Researcher, Naturalis Biodiversity Center, Darwinweg 2, 2333 CR Leiden, The Netherlands.

³Ecosystem-Based Management of Marine Resources, Environment and Life Sciences Research Center, Kuwait Institute for Scientific Research, Kuwait.

Abstract The tellinid genus *Pseudopsammobia* is revisited and the type species *P. simplex* (Sowerby) from Hong Kong is redescribed. A new species *P. derelictus* Oliver, Dekker & Al-Kandari is described from Kuwait in the northern Arabian Gulf and disjunctly from the north-eastern Arabian Sea adjacent to Pakistan and northern India. Shells from Thailand and Australia are considered but are not adequately defined due to lack of material.

Key words Taxonomy, Tellinoidea, Kuwait, Arabian Sea, Indo-West Pacific

INTRODUCTION

Since 2014 extensive surveying of the intertidal marine malacofauna has been carried out by the Kuwait Institute for Scientific Research (Al-Kandari *et al.*, 2020) and recently further collecting has been carried out in preparation of an identification atlas to the Mollusca of the intertidal of Kuwait. These collections have revealed a number of taxonomic problems, either as possible new species or records of species new to Kuwait or the Arabian Gulf. This is one of a number of projected studies on taxonomy of bivalves from Kuwait, the first on a new species of Montacutidae (Oliver *et al.* (2017) and latterly two papers on oyster species (Al-Kandari *et al.*, 2021 and Salvi *et al.*, 2022, 2023).

Huber, Langleit and Kreipl in Huber 2015 erected the genus *Pseudopsammobia* for species that are superficially similar to species of the Psammobiidae. They differ however in having both anterior and posterior lateral teeth and are therefore part of the Tellinidae. Two species were allocated to *Pseudopsammobia*, *Psammobia simplex* GB Sowerby III, 1894 and *Psammobia philippinensis* EA Smith, 1916.

Pseudopsammobia simplex was given as the type species and was stated to be distributed through Indonesia, northern Australia and China, the

type locality being Hong Kong. Other literature records include Singapore and Thailand (Lyngé, 1909; Robba, 2002), and Karachi (Melvill & Standen, 1907).

The illustrations of *P. simplex* in Huber (2015) indicate a thin, elliptical shell with subparallel ventral and dorsal margins and dense but weak radial raised striations on the posterior area. It should be noted that this is not the type specimen nor is it toptotypical coming from northern Australia rather than Hong Kong. *P. philippinensis* is a small species not exceeding 10mm and as described by Smith has fine radial sculpture on both posterior and anterior areas as well as divergent threads on the posterior. The type specimen was not figured by Huber (2015) but from his figures and Smith's description we can exclude this species from our research.

In Kuwait, in the northern Arabian Gulf, during 2018 and 2019 the authors made collections of beached shells from Bubyán, Miskan Island and East coast of Failaka Island. Among these were considerable numbers of a tellinid that can be placed in the genus *Pseudopsammobia*. Similar shells have also been found from Pakistan and northern India. However, there are sufficient differences between the Arabian shells and that illustrated by Huber (2015) to warrant a more detailed examination of *P. simplex* across its apparent range.

METHODS

All images were made using a Nikon D750 with a 1:1 macro lens or attached to a Leica Z6APO macroscope and all processed using Helicon Focus™ stacking software.

Abbreviations

NHM, NHMUK	Natural History Museum, London
NMW, NMW.Z	National Museum of Wales, Cardiff
al	anterior lateral tooth
c^a	anterior cardinal tooth
c^p	posterior cardinal tooth
lig	ligament
lv	left valve
pl	posterior lateral tooth
rv	right valve
sh	shell
spec	specimen
v	valve/s

SYSTEMATICS

Pseudopsammobia simplex (GB Sowerby III, 1894)

Huber (2015) does not indicate having examined the type material from Hong Kong but in the NHM two syntypes are present under 1894.4.29.173/4. In the Melvill-Tomlin collection in the NMW two further syntypes are present from Hong Kong, ex Sowerby (provenance from label style), one of which exactly matches the size given in the original description. The description although not detailed also matches the shells in the NMW. The NMW holds material that is directly associated with Hungerford whose collection was used by Sowerby for his 1894 paper and thus the presence of potential type material of this Sowerby species in the NMW is not surprising.

Type material Syntype 1 – 9.2×5.5×3.0 mm: in National Museum of Wales, Cardiff, NMW.1955.158.20631a (Figs 1–6), Syntype 2 – 8.3×5.1mm, NMW.1955.158.20631b, Syntype 3 – 8.7×5.2×2.6 in Natural History Museum United Kingdom, London, NHMUK 1894.4.29.173 (Fig. 7), Syntype 4 – 9.3×5.3×2.6 NHMUK 1894.4.29.174 (Fig. 8).

Other material examined 3v., Australia Northern Territory, Darwin, Vestey's Beach, Fannie Bay. leg.

JJ ter Poorten, 14–17 July 2014, in coll. Dekker, Winkel, NL. #35084

Description

Shell thin; compressed; very slightly inequivalve, lv more inflated than rv; ±equilateral; umbos low, beak projecting. Outline oblong, anterior dorsal margin distinctly sloping, posterior dorsal margin also sloping but a little concave, posterior broadly rounded but weakly bi-angulate, posterior margin more narrowly and evenly rounded, ventral margin long weakly curving. Ligament projecting above dorsal margin on a weak nymph in a very narrow, short, weakly excavated, escutcheon; anterior dorsal (lunule) area weakly excavated, very narrow, short. Sculpture of commarginal lirae becoming developed as smooth ribs towards ventral margin; posterior area of both valves with 12 weak radial threads running from beaks, fading towards margins. Hinge, rv 2 small cardinal teeth, anterior weakly bifid, distant anterior and posterior weakly socketed laterals: lv 2 small cardinals, anterior weakly bifid, posterior laminar, distant anterior and posterior marginal laterals. Inner margin smooth, inner surface shiny, muscle and pallial scars not visible. Shell colour white, occasional orange marks of uncertain origin.

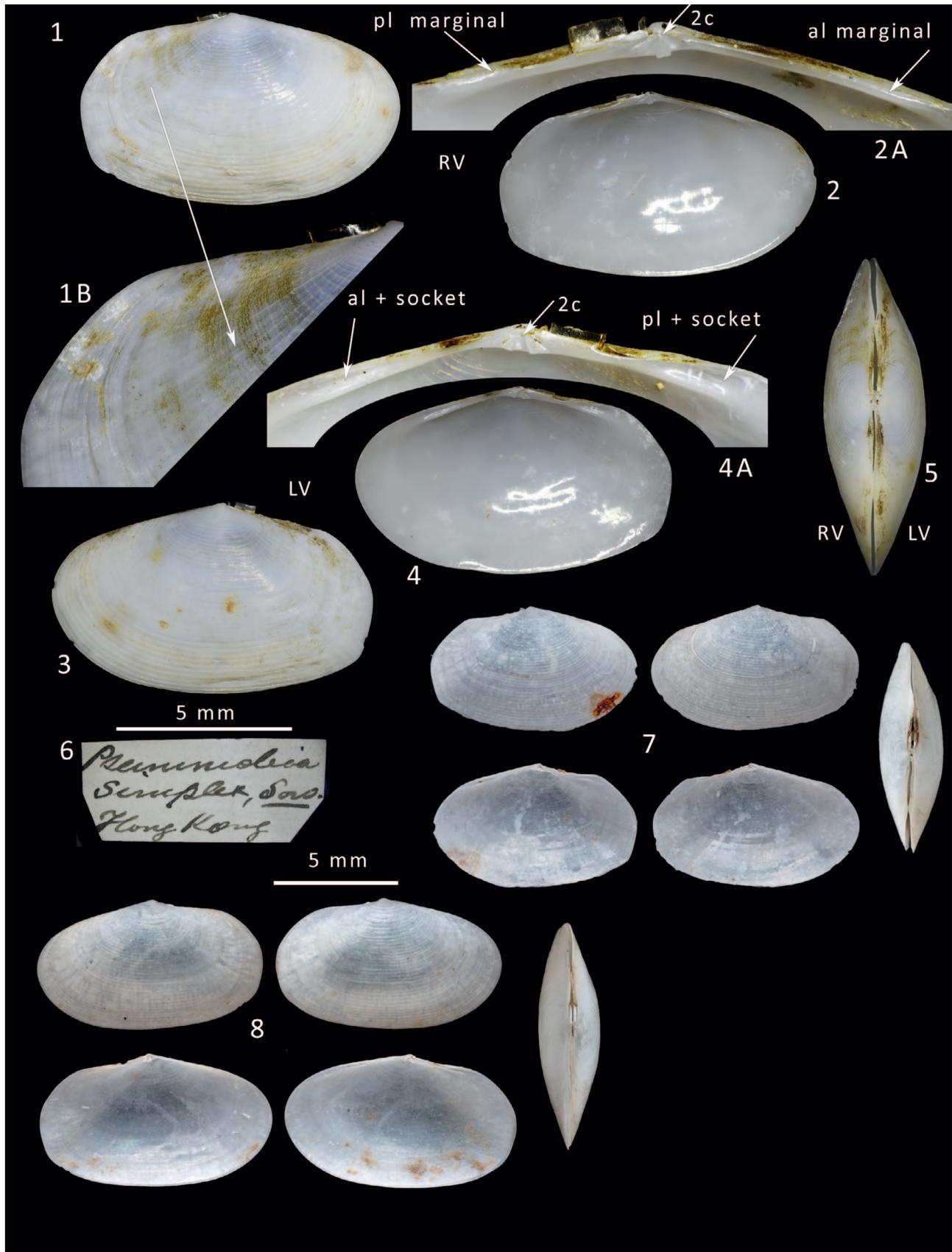
Comparisons

Huber (2015, p. 255) illustrated what he regarded as *P. simplex* from Northern Australia and we have 3 valves (Fig. 9) from Darwin, Northern Territories for comparison. These shells range from 9.0 to 13.4mm, only the smallest left valve is of comparable size to the syntype series and the largest closest to the figured shell in Huber (2015) given as 16mm. In outline and sculpture our valves appear close to that figured by Huber but differ somewhat from the shells of the syntype series in that the commarginal sculpture is finer and the overall shape more oblong, that is the relative height to length is greater. However, without more and better specimens a conclusive decision cannot be reached.

Pseudopsammobia derelicta sp. nov

Isid:zoobank.org:act:3CBB47F4-18AF-4C10-A551-640EDA9D4D99

Holotype 1 **sh.**, paired valves beach collected, Arabian Gulf, Kuwait, Miskan Island, 29.487493



Figures 1–6 Syntype of *Psammobia simplex* Sowerby, 1894, NMW.1955.158.20631a. 1,1a, external of RV. 2, 2a internal and hinge of RV. 3, external of LV. 4, 4a internal and hinge of LV. 5, dorsal view. 6, Sowerby label. 7 Syntype of *P.simplex* NHMUK 1894.4.29.173, 8 Syntype of *P.simplex* NHMUK 1894.4.29.174.



Figure 9 Shells of *Pseudopsammobia* aff. *simplex* from Darwin, Northern Territories, Australia Coll. Dekker, Winkel, NL. #35084.

N, 48.246921 E. coll. H. Dekker & PG Oliver, 15/12/2019, NMW.Z.2021.009.014. (Figs 10–15).

Paratypes **9lv + 9rv**, dead collected, Arabian Gulf, Kuwait, Miskan Island, 29.487493 N, 48.246921 E. coll. H. Dekker & PG Oliver, 15/12/2019, NMW.Z.2021.009.015. **8lv + 8rv**, dead collected, Arabian Gulf, Kuwait, Failaka Island, SE coast, 29.393140 N 48.398018E, coll. PG Oliver & H. Dekker, 1/12/2019, NMW.Z.2021.009.016. **1 sh.** live collected, Arabian Gulf, Kuwait, Miskan Island, 29.486565° 48.248460°, lower intertidal in fine mud, coll. PG Oliver, March, 2016, In collection of Kuwait Institute for Scientific Research, Salmiya Kuwait. Figs 16–17.

Other material examined **70 v.**, Arabian Gulf, Kuwait, Miskan Island, 29.487493 N, 48.246921 E. coll. H. Dekker & PG Oliver, 15/12/2019. in coll. Dekker, Winkel, NL. **41 v.**, Arabian Gulf, Kuwait, Failaka Island, SE coast, 29.393140 N 48.398018E,

coll. PG Oliver & H. Dekker, 1/12/2019. in coll. Dekker, Winkel, NL. **3 v.**, Arabian Gulf, Kuwait, Umm Al-Namil Island, south-east side 29.380240 N 47.869381 E. coll. PG Oliver & H. Dekker, 31/11/2019, in coll. Dekker, Winkel, NL. **1 v.**, India, Gujarat, Gulf of Kutch, Mandvi/Sulaya, Torun Beach Resort, leg. Ceuninck van Capelle, 4/1/1999 in coll. Dekker, Winkel, NL., #45260. **2 v.**, India, Gujarat, Gulf of Kutch, Mandvi/Sulaya, Torun Beach Resort, leg. Ceuninck van Capelle, 3/3/2000 in coll. Dekker, Winkel, NL. #45261. **1 v.**, India, Gujarat, Gulf of Kutch, Mutva village, leg. Ceuninck van Capelle, 6/3/2000 in coll. Dekker, Winkel, NL. #45262. **2 v.**, India, Gujarat, Gulf of Kutch, Ravalpir, leg. Ceuninck van Capelle, 6/3/2000 in coll. Dekker, Winkel, NL. #45263. **7 sh.**, Arabian Sea, Pakistan, off Karachi, 5 fms. Cited as *Gari simplex* in Melvill & Standen, 1902, p. 842, in Melvill-Tomlin Coll. NMW.1955.158.27633. **5 v.**, Thailand, Gulf of Thailand, Ban Pak Nam Sakom, near Leela

Figures 10–17 Holotype of *Pseudopsammobia derelicta* n. sp. NMW.Z.2021.009.014. **10, 11**, External views of left and right valves, umbonal regions enlarged and tilted to view outlines of early shell. **12**, internal and hinge of LV. **13**, internal and hinge of RV. **14**, dorsal view. **15**, posterior view showing twist to the right side. **16–17** Paratype, of *Pseudopsammobia derelicta* n. sp. Kuwait Institute for Scientific Research. Left and right valves of a live collected juvenile.



Resort, 06°57'14"N 100°51'27"E. coll. H. Dekker, 20/1/2000 in coll. Dekker, Winkel, NL, #11884

Description

Holotype, beached but paired valves, length=14.7mm (Figs 10–15)

Shell thin but robust, equivalve but posterior slightly twisted to the right (Fig. 15). Outline elliptical with long sloping anterior and posterior dorsal margins; posterior slightly truncated, anterior narrowly rounded, ventral a shallow curve. Early umbonal area showing the more oblong outline of the juvenile (Figs 10 & 11 detail) Sculpture of fine commarginal lirae becoming larger and more closely spaced towards the margin; early sculpture visible over umbonal area (Figs 10 & 11 detail) but radial striae becoming obsolete and rugosity of right valve fading (Fig. 11); Hinge, lv (Fig. 12) 2 small cardinals, anterior weakly bifid, posterior laminar (c^p), distant anterior and posterior marginal laterals al^m, pl^m): rv (Fig. 13) 2 small cardinal teeth, anterior weakly bifid (c^a) distant anterior (al) and posterior (pl) weakly socketed laterals: Pallial sinus wide (Fig. 13), extending slightly more than half the length of the shell, mostly confluent with pallial line. Cruciform muscle scars indistinct.

Small live collected specimen, length=6.3mm (Figs 16 & 17)

Shell thin; compressed; very slightly inequivalve, lv more inflated than rv; ±equilateral; umbos low, beak projecting. Outline oblong, anterior dorsal margin gently sloping, posterior dorsal margin also sloping but concave, posterior broadly rounded but weakly bi-angulate, posterior margin more narrowly and evenly rounded, ventral margin long weakly curving. Ligament projecting above dorsal margin on a weak nymph in a very narrow, short, weakly excavated, escutcheon; anterior dorsal (lunule) area weakly excavated, very narrow, short. Sculpture discrepant, rv rugose over posterior area with 9 faint radial striae (Fig. 17) of fine commarginal lirae elsewhere; lv whole surface with commarginal lirae these crossed by 8 radial striae over posterior (Fig. 16). Hinge, rv 2 small cardinal teeth, anterior weakly bifid, distant anterior and posterior weakly socketed laterals: lv 2 small cardinals, anterior weakly bifid, posterior laminar, distant anterior and posterior marginal laterals. Inner margin smooth, inner surface shiny,

muscle and pallial scars not visible. Shell colour white.

Type locality Arabian Gulf, Kuwait, Miskan Island, 29.487493 N, 48.246921 E.

Derivation of name *derelecta* from *derelictus* Latin, neglected or abandoned pertaining to the overlooked status of the Arabian species.

Range Disjunct, northern Arabian Gulf, Kuwait then region of the Indus delta (Pakistan) and Gulf of Kutch (India) (Fig. 21)

Habitat Very few direct data are available, the only live collected specimen in Kuwait was taken from fine sloppy mud in the low intertidal. The offshore environment in the northern waters of Kuwait is of a shallow highly turbid water overlying very soft muds or muddy sands. The region is affected by the influxes from the Tigris and Euphrates rivers such that the water may at sometimes be brackish but at other times hypersaline.

Remarks

Ontogenetic changes are marked in this species with the rather oblong juveniles giving way to the more elongate adult form with sloping dorsal margins (Fig. 18). In the older shells the posterior sculpture also fades but this may be due to the majority of observed shells being somewhat beach worn. These ontogenetic changes also make comparisons with the syntype series of *P. simplex* restricted to small shells.

Comparing the Kuwait shells with those of the syntype series of *P. simplex* reveals a number of differences primarily in the sculpture over the posterior area. Whereas in the syntypes of *P. simplex* the pattern is the same on both right and left valves in the Kuwait shells the right valve is distinctly rugose and radial striae less apparent and fewer in number.

If indeed, Huber is correct in assigning the Australian shells to *P. simplex* then the differences persist into adult shells and it would appear that the larger shells remain more oblong and do not develop the sloping dorsal margins, The Australian shells are not rugose on the posterior of the right valve and the overall commarginal sculpture is finer.

We conclude that the Kuwait shells are not conspecific with *P. simplex* as represented by the



Figure 18 Paratypes of *P. derelicta* n. sp in size series from Miskan NMW.Z.2021.009.015 and Failaka islands NMW.Z.2021.009.016, Kuwait.

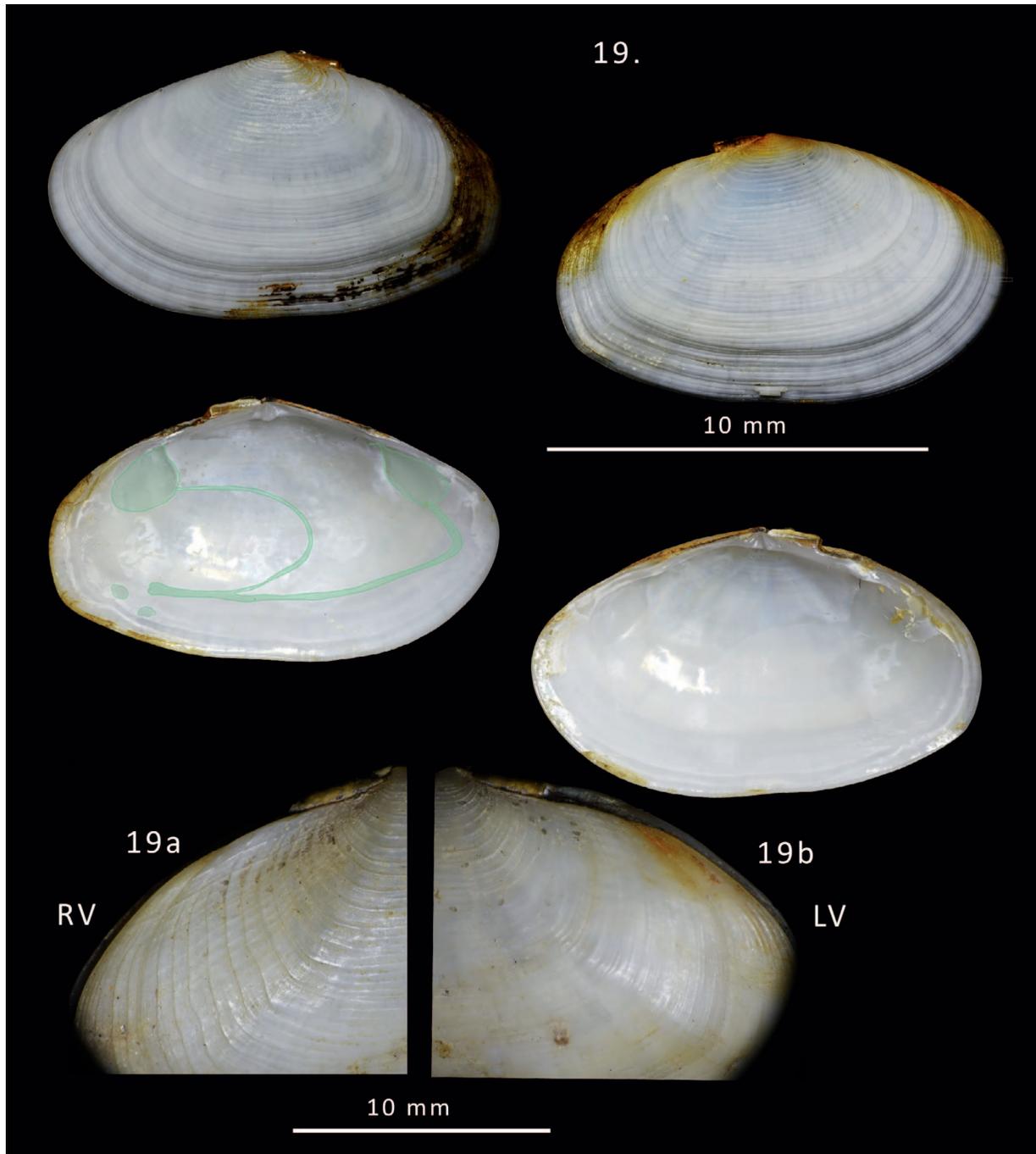


Figure 19 *Pseudopsammobia derelicta* n. sp from Karachi, Melvill-Tomlin Coll. NMW.1955.158. **19a**, detail of posterior of RV. **19b**, detail of posterior of LV.

type series and not conspecific with the shells from Australia.

Shells from Karachi have sloping dorsal margins (Fig. 19) and the discrepant posterior sculpture is very evident (Fig. 19a,b) and we consider these to be conspecific with the Kuwait material. The shells from the Gulf of Kutch, although largely beach worn can also be considered conspecific with those from Karachi and Kuwait.

Of a contentious affinity are the specimens recorded from Thailand for which we have 5 beached valves (Fig. 20). The larger shell (Fig. 20a) bears a strong resemblance to that figured by Robba *et al.* (2002: 100. pl. 15, fig. 8a)

The smallest right valve (Fig. 20b) retains a dense radial sculpture without rugae and is closer to the syntypes of *P. simplex* rather than those of *P. derelicta*. However, the larger valves develop

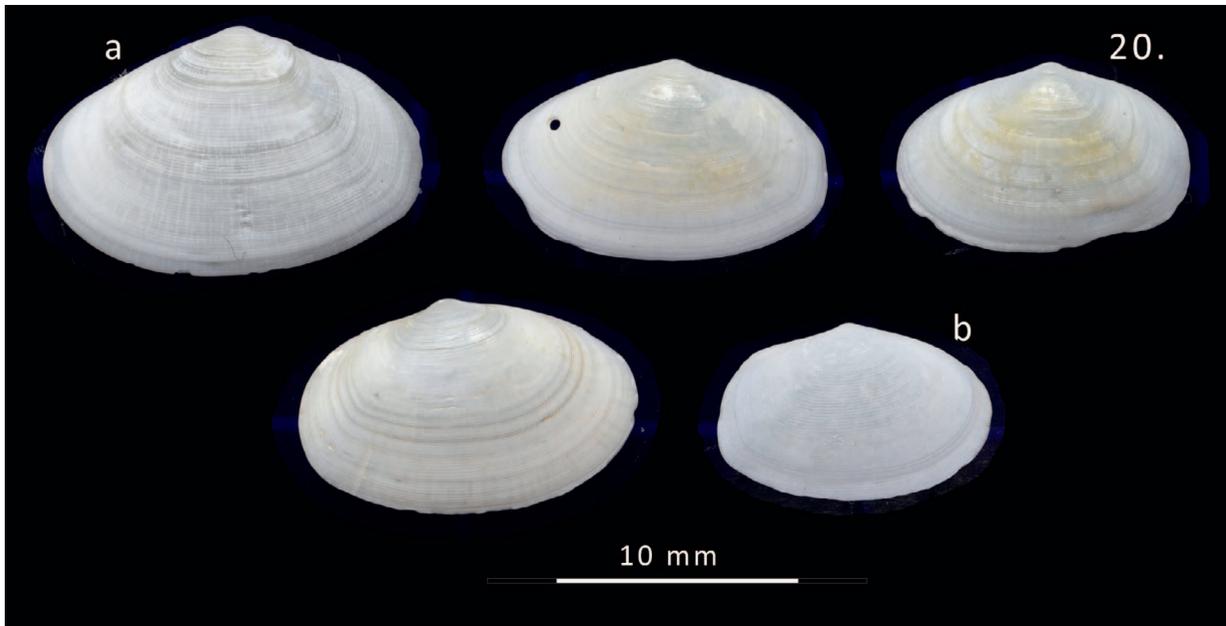


Figure 20 *Pseudopsammobia* cf. *simplex* from Thailand, Coll. Dekker, Winkel, NL, #11884.

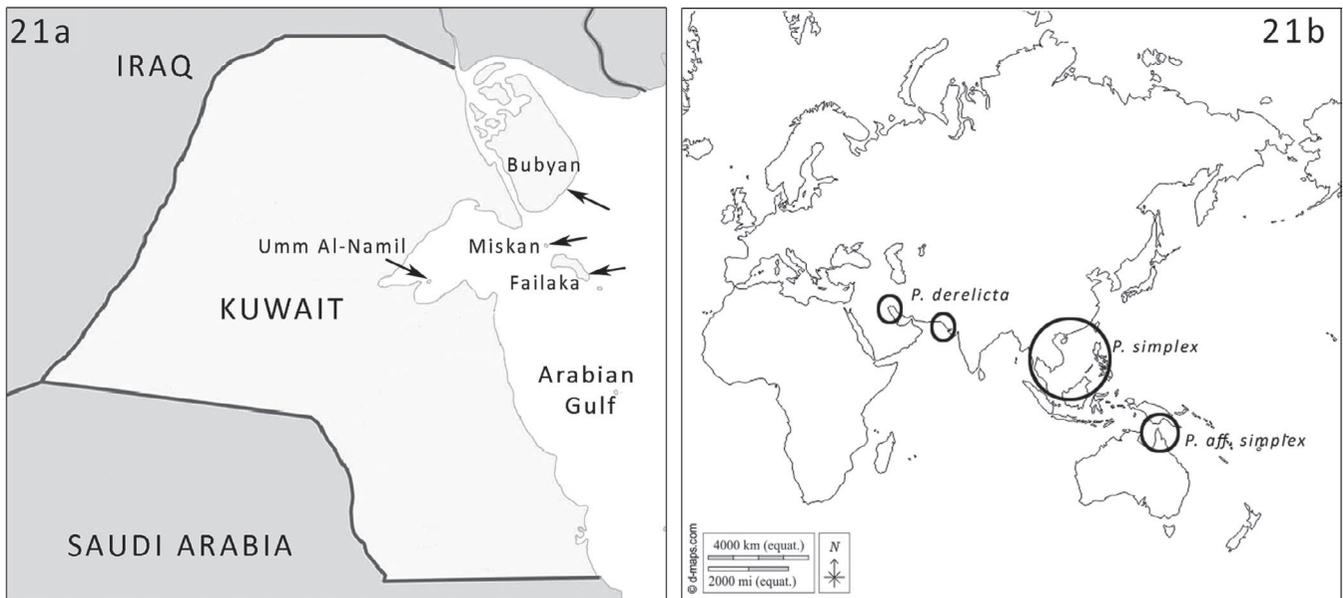


Figure 21 Distribution maps for *Pseudopsammobia derelicta* and *P. simplex*. 21a collection sites for *P. derelicta* in Kuwait. 21b Known distribution of *P. derelicta* and *P. simplex* across the Indo-Pacific.

sloping dorsal margins and are more similar to Arabian *P. derelicta* than to the Australian shells.

The Thai shells are rather beach worn and resemble *Tellinides timorensis* Lamarck, 1818 but have the beaks positioned more posteriorly. We as yet do not know if *P. simplex* develops the dorsal sloping margins or if indeed it reaches the larger size of Arabian and Australian shells. It is not inconceivable that the Australian shells are not *P. simplex*.

From biogeographical distributions (Fig. 21b) it is more likely that the Thai shells are *P. simplex*, given the proximity of the Gulf of Thailand to the South China Sea. Shells of *Pseudopsammobia* have not been recorded further west of Thailand in the Western Indian Ocean and the genus does not appear until the NE Arabian Sea and northern Arabian Gulf. The pattern of species found only in the northern Arabian Gulf and in the Pakistan/Gujerat region of the Arabian Sea is

not unique to *Pseudopsammobia* but is also seen in *Congetia chesneyi* (Oliver & Chesney, 1994) and *Protapes cor* (GB Sowerby II, 1853) and seems to be most pertinent to species inhabiting soft, muddy environments (pers. obs. PG Oliver).

CONCLUSION

Given the differences in the shell sculpture between the Arabian shells and those of the syntype series of *P. simplex* we conclude that they are not conspecific and erect *P. derelicta* sp. nov. for the Arabian species.

Shells from Thailand and northern Australia cannot be conclusively assigned to any known species of *Pseudopsammobia* but the suggestion is that the Thailand shells are *P. simplex* but the Australian shells are a separate and yet undescribed species. At this time there is insufficient material to resolve this situation.

ACKNOWLEDGEMENTS

PG Oliver and H Dekker wish to acknowledge the help given by the staff of the Kuwait Insitute for Scientific Research in the collection of the shells and access to the offshore islands of Miskan and Failaka. PG Oliver also appreciates the continuing remote access to the University of Bangor Library. Also to Harriet Wood for facilitating the registration of specimens into the collection of the National Museum of Wales.

REFERENCES

- AL-KANDARI M, OLIVER PG, CHEN W, SKRYABIN V, RAGHU M, BISHOP MJ, HUSSAIN S, AL-JAZZAF S, YOUSIF, A 2020 Diversity and distribution of the intertidal Mollusca of the State of Kuwait, Arabian Gulf. *Regional Studies in Marine Science*, **33**: 1–19.
- AL-KANDARI M, OLIVER PG, 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.
- HUBER M 2015 *Compendium of Bivalves 2*. Harxheim ConchBooks 907 pp.
- LYNGE H 1909 The Danish expedition to Siam 1899–1900. IV. Marine Lamellibranchiata. *Det Kongelige Danske Videnskabernes Selskabs Skrifter, Naturvidenskabelig og Matematisk Afdeling*, (7) **5**(3): 97–299, pl: 1–5.
- MELVILL JC & STANDEN R 1907 The Mollusca of the Persian Gulf, Gulf of Oman and Arabian Sea, as evidenced mainly through the collections of Mr. F. W. Townsend, 1893–1906; with descriptions of new species. 2 Pelecypoda. *Proceedings of the Zoological Society of London*. **20**: 783–848, pls 53–56
- OLIVER PG & CHESNEY HCG 1994 Taxonomy of Arabian Bivalves. Part 1. Arcoidea. *Journal of Conchology* **35**(1): 17–31.
- OLIVER PG, SKRYABIN VA & AL-GHUNAIM AY 2017 A new genus and species of galeommatoid bivalve (Mollusca: Bivalvia: Montacutidae) from Kuwait Bay, Arabian Gulf. *Zoology in the Middle East*, DOI: 10.1080/09397140.2017.1299317
- ROBBA E, DI GERONIMO I, CHAIMANEE N, PIETRO NEGRI M & SANFILIPPO R 2002 Holocene and Recent shallow soft-bottom mollusks from the Western Gulf of Thailand: Pak Phanang Bay and additions to Phetchaburi fauna. *Bollettino Malacologico* **38** (5–8): 49–132.
- SALVI D, AL-KANDARI M, OLIVER PG, BERRILLI E & GARZIA M 2022 Cryptic marine diversity in the northern Arabian Gulf: An integrative approach uncovers a new species of oyster (Bivalvia: Ostreidae), *Ostrea oleomargarita*. *Journal of Zoological Systematics and Evolutionary Research*. DOI 10.1155/2022/7058975: 1–19., available online at <https://doi.org/10.1155/2022/7058975> note: nomenclaturally unavailable: no ZooBank registration
- SALVI D, AL-KANDARI M, OLIVER PG, BERRILLI E & GARZIA M 2023 Corrigendum: Salvi D, Al-Kandari M, Oliver PG, Berrilli E, Garzia M (2022) Cryptic marine diversity in the northern Arabian Gulf: an integrative approach uncovers a new species of oyster (Bivalvia: Ostreidae), *Ostrea oleomargarita*. *Journal of Zoological Systematics and Evolutionary Research* **2022**: 7058975. <https://doi.org/10.1155/2022/7058975>. *ZooKeys*. **1143**: 89–92.
- SMITH EA 1916 On a collection of Pelecypoda from the Philippine islands. *Proceedings of the Malacological Society of London* **12** (1): 12–19, pl. 1.
- SOWERBY GB II 1853 Monograph of the genus *Venus*. In: GB Sowerby II (ed.), *Thesaurus conchyliorum, or monographs of genera of shells*. Vol. 2 (14): 703–739, pl: 152–162. London,
- SOWERBY GB III 1894 Descriptions of new species of marine shells from the neighbourhood of Hong-Kong. *Proceedings of the Malacological Society of London*. **1**(4): 153–159, pl. 12.