

An archaeological and ecological curiosity - *Terebralia palustris* (Linnaeus, 1767) in the north-east of the Emirate of Abu Dhabi

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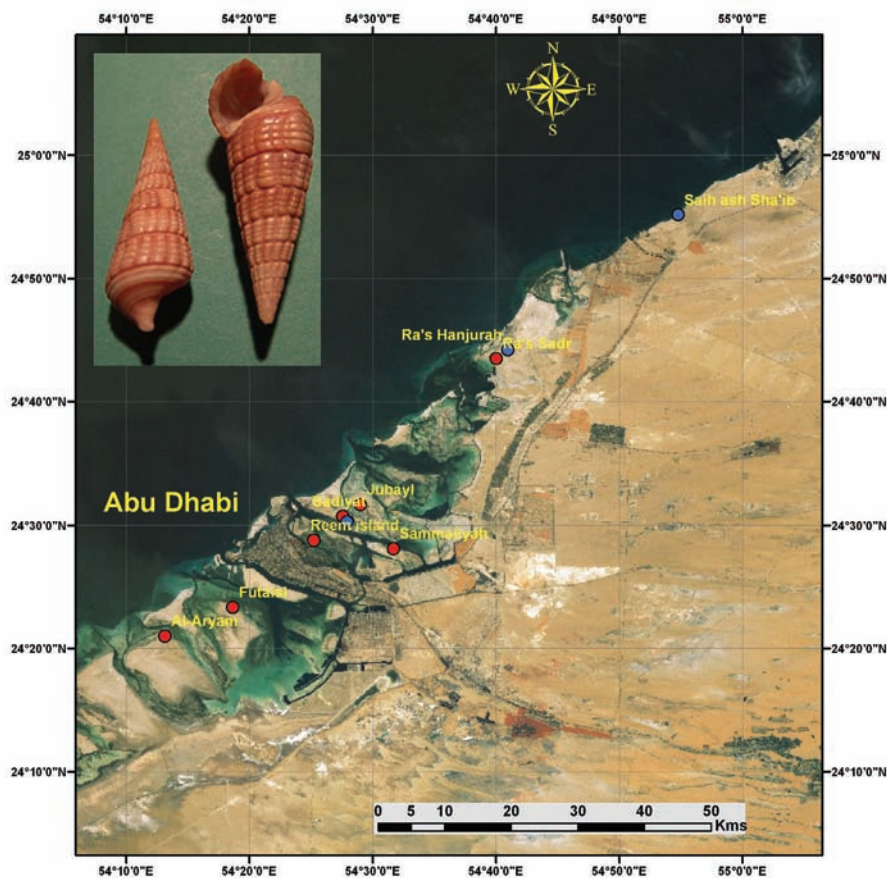


Fig. 1: Distribution of *Terebralia palustris* in north-eastern Abu Dhabi Emirate. The red dots indicate archaeological sites where *T. palustris* have been found, and the blue dots sites where *T. palustris* have been identified in a non-archaeological context. Mapping by Dr. Mark Beech

Introduction

A recent study (Feulner 2000) of the distribution of the large mangrove mud creeper *Terebralia palustris* (Linnaeus, 1767) in non-mangrove environments in south-eastern Arabia noted that this large and easily identifiable gastropod is now believed to be extinct in the Arabian Gulf, at least on the Arabian side. Further investigation of Iranian sources has since disclosed the existence of populations at two areas in Iran, within and adjacent to the Straits of Hormuz (Feulner, *pers. comm.*, citing information provided by Dr. Peter J. Hogarth, Department of Biology, University of York, from written and oral sources).

T. palustris is recorded from archaeological sites on the Arabian Gulf coast of the Northern United Arab Emirates dating from the Neolithic (Late Stone Age) period (c. 5,500 BC - 3,500 BC) to the late pre-Islamic period, (300 BC - 650 AD), initially being common, and then gradually becoming less so during the early centuries of the Christian era, apparently disappearing around 400 AD (Glover 1998). Subsequent work by Glover may substantially extend the date of final disappearance but the overall record remains one of steady decline (Feulner, *pers. comm.*).

Feulner also noted (citing personal communications from PH and from Dr. Mark Beech) that "with three exceptions

[these all being on archaeological sites that have been ascribed a Late Islamic date - i.e. 16th - early 20th Century AD], it [*T. palustris*] is absent from beach sands, sedimentary deposits and archaeological contexts in Abu Dhabi emirate" (Feulner 2000: 17) and also that the species "is essentially absent at [Arabian Gulf] sites [in the Northern Emirates] dating from the early Christian era to the present."

Glover (1998:73) commented that "there are still areas of mangrove remaining in the Arabian Gulf, particularly in Abu Dhabi, which would appear to be suitable for *Terebralia*," although she was not aware when she wrote her paper that *T. palustris* shells had already been identified on Late Islamic sites in the Emirate of Abu Dhabi, referring only to the fact that they were not present at sites on the island of Dalma, in the far west of the Emirate.

Recent discoveries in the north-east of the Emirate of Abu Dhabi and immediately-adjacent areas of Dubai, both archaeological and environmental, have, however, shown that dead *T. palustris* shells are more common there than was previously realised, albeit in a relatively limited area, and that they are found both on archaeological sites and in non-archaeological contexts that suggest that a live population of the species continued to survive well into the Late Islamic period (Fig. 1).

Previous data

The three then-known sites to which Feulner and his informants referred were the following (Site codes, where mentioned, are those included on the Abu Dhabi Archaeological Sites Database, initiated by the Abu Dhabi Islands Archaeological Survey, ADIAS):

Ra's Sadr (Site RS0004)

A shell scatter and possible cairn adjacent to the northern side of a shallow tidal creek at Ra's Hanjarah, c. 50 km. to the north-east of Abu Dhabi island. The Ra's Hanjarah and Ra's Sadr area forms the north-eastern end of a large area of small islands and shallow lagoons bounded, on the south-west, by the island of Abu Dhabi. A few *T. palustris* shells were present, with other molluscs, although there were no associated finds to permit dating.

Jubayl (Site JUB0001)

A Late Islamic pottery scatter with "several dozen" *T. palustris* shells (also shells of another large edible gastropod *Hexaplex kuesterianus*) in a depression on a dune on the south-west side of Jubayl island, to the north-east of Abu Dhabi island. A secondary site on the same sand dune, approximately 25 metres away, allocated the separate site code of JUB0002, had a scatter of Late Islamic "Julfar" ware with more associated *T. palustris* and *H. kuesterianus* shells.

Al-Aryam (Site ARY0005)

The site of the former Late Islamic fishermen's village of Bu Karwah, on the east side of the island of Al-Aryam (formerly known as Bu Khushaishah), c. 15 kilometres to the west of Abu Dhabi island. Mollusc shells present include *T. palustris*, *H. kuesterianus*, *Pinctada radiata* (pearl oyster) and *Spondylus marisrubri*. *T. palustris* represents less than one per cent of all shells present. The site is believed to have been abandoned in the late 19th / early 20th Century.

Taken together, these three sites suggested that *T. palustris* might once have been present in the area of islands and lagoons that stretch from Ra's Sadr / Ra's Hanjarah, in the north, past Abu Dhabi island to Al-Aryam and Dabb'iya, the peninsula immediately to the west of Al-Aryam. Of particular interest was the fact that, where *T. palustris* shells were associated with pottery, this appeared all to be of Late Islamic date - this certainly being the case with Site ARY0005, which is known from oral tradition to have been occupied into recent times and from which no earlier material has been identified.

Only a small number of shells were found at each of these three sites and, in view of the fact that the species was not known from elsewhere in the Emirate of Abu Dhabi, and that, according to Feulner (2000) it was known from naturally-occurring beach deposits no nearer than Jebel Ali, in south-western Dubai, it was initially speculated that *T. palustris* might have been imported to the sites from a considerable distance, perhaps as a "luxury" item or, as a long-lasting "travel snack", since it can survive, once collected, in edible condition for some days.

New data

During the course of subsequent (post-2000) archaeological and ecological surveys carried out by the authors and others on islands close to Abu Dhabi island and in the Abu Dhabi / Dubai border area, further finds have permitted a re-assessment of the former status of *T. palustris* in the Emirate of Abu Dhabi, and it now appears certain that the species was not only exploited during the Late Islamic period but that it was naturally present. A previously overlooked published record of the presence of *T. palustris* in the Emirate has also been traced (Biggs 1973). In terms of

exploitation of the species, the following previously-unrecorded archaeological sites have been identified:

One, Futaisi, lies to the west of Abu Dhabi.

Futaisi (Site FUT0006)

Several species of molluscs were collected here, adjacent to a small Late Islamic mosque and a Late Islamic pottery scatter. Species present included *T. palustris*, *P. radiata* and *Conus* sp. The mosque was originally recorded (by J. Czastka) in 1996, with the pottery and shell scatter being recorded by D. Hull and PH in 2001 (Hull & Hellyer, 2001).

Other new records come from islands to the north-east of Abu Dhabi.

Sadiyat (Site SAD0016)

On the island of Sadiyat, an archaeological survey undertaken in June 2005 by the Abu Dhabi Islands Archaeological Survey, ADIAS, identified a shell midden, site SAD0016, on a rocky outcrop on the north-east side of the island in which several mollusc species were present, including, *Pinctada radiata*, *Hexaplex kuesterianus* and *Murex* sp., as well as a large number of *T. palustris* shells (Kallweit & Hellyer 2005). In the same area are several other archaeological sites, SAD0003, SAD0013, SAD0014, SAD0017 and SAD0018, including shell-middens, hearths, stone structures and pottery scatters. The pottery sherds, of which over 2,600 have been collected, are Late Islamic in date, although there is a very small number of Late Stone Age lithics, indicating an earlier occupation of the site (Kallweit, Beech and Cuttler 2006; Kallweit and Hellyer 2006). Thus it is not possible, without dating of the *T. palustris* shells, to determine to which phase, or phases, of occupation they may relate.

"Reem Island"

"Reem Island" (formerly known as Abu Shuum) lies between Sadiyat and Abu Dhabi island. This site was first identified (by the authors) in mid-June 2006, and comprises a loose midden of shells with an associated scatter of Late Islamic pottery and evidence of simple fireplaces, at the south-eastern corner of the island. Mollusc shells observed during a very preliminary examination included *Marcia* sp. *Hexaplex kuesterianus* and a single *T. palustris*. Although, in itself, the single shell is of minimal significance, it complements other evidence of the former presence of the species during the Late Islamic period on the islands of Sadiyat and Jubayl, immediately to the north-east.

Sammaliah (Site SAM0001)

Around 10 kilometres to the east, a site on the island of Sammaliah, SAM0001, initially identified by Dr. Ron Loughland of the Department of Environmental Research of the Emirates Heritage Club, has produced *T. palustris* shells in association with Late Islamic pottery (Loughland, pers. comm.). Due to the difficulty of access, very little archaeological survey work has been done in the area of islets immediately to the north of Sammaliah, and it is possible that further archaeological sites remain to be identified in this area.

Discussion

Dating of archaeological sites with *T. palustris*

A secure dating of all of the archaeological sites is not possible, since there were no associated finds at the Ra's Sadr / Ra's Hanjarah site, RS0004. The group of shell middens on Sadiyat is loosely associated with a small collection of Late Stone Age lithics (Kallweit & Hellyer 2006) although the pottery present is from the Late Islamic period (Beech, Kallweit & Cuttler 2006). In the case of the Al-Aryam,

Al-Futaisi, Sammaliah and Jubayl sites, the *T. palustris* shells are associated with Late Islamic pottery (Hellyer 2000; Hull & Hellyer 2001; Hellyer, Czastka & Aspinall 1995). The same is true of the site on "Reem Island."

It seems reasonable, therefore, to conclude that a population, or populations, of *T. palustris* existed in the lagoons and mangroves of north-eastern Abu Dhabi Emirate in the Late Islamic period, and possibly earlier. It should be noted, though, that no *T. palustris* shells have been reported from the Bronze Age site at Umm al-Nar, or from the Late Stone Age / Bronze Age site at Abu Dhabi International Airport.

The species has also not been identified on archaeological sites or in natural locations, such as beach deposits, anywhere in western Abu Dhabi (i.e. to the west of the Dabb'iyah peninsula), while, as noted earlier, it virtually disappears from archaeological sites in the Northern Emirates during the early centuries of the Christian era.

Non-archaeological evidence of *T. palustris*

The lagoons and mangrove forests to the north-east of Abu Dhabi have not yet been subjected to a detailed environmental study. However, there are now three records of *T. palustris* shells being found in natural environments in the north-east Abu Dhabi area.

The first record dates back to between 1961 and 1965, but has only just been noted locally. Between those years, a team of geologists from Imperial College London, led by Professor

Graham Evans, collected molluscs from beaches, inter-tidal flats, lagoons and near-shore zones along the coast of the Emirate of Abu Dhabi, the results of which were published in Biggs (1973). Two damaged *T. palustris* shells were collected at Station 51, a beach on the south-west of Sadiyat island, these then being the first records for the Arabian Gulf. Biggs commented that "It seems remarkable that such a large and conspicuous species has not been recorded before, and there is just the possibility that these specimens may have come in with ballast." (Biggs 1973:358).

Neither Evans and his colleagues nor the Reverend Biggs were aware of the existence of archaeological sites containing *T. palustris* shells in the vicinity (these being identified much later), while there had also been no publication of the presence of the species on middens in the Northern emirates.

The second and third new records, however, are the sites of former coastal lagoons identified by one of the authors (SA), which appear to confirm the earlier presence of live populations of *T. palustris* north-east of Abu Dhabi city.

On a former inter-tidal flat near Ra's Hanjurah, several hundred *T. palustris* shells are widely scattered over an area of several hundred square metres (Fig. 2). There are no archaeological sites known in the immediate vicinity, and the shells appear to be in a natural position. It is unlikely, moreover, that they have been deposited by man, since in locations where *T. palustris* has been collected for food, the empty shells then being discarded, they are normally found in clusters or heaps, not scattered singly.



Fig.2: *T. palustris* in situ on a now dry inter-tidal lagoon at Ra's Hanjurah. Picture: Simon Aspinall

At the inner edge of the inter-tidal flat, now cut off from the sea by a road, there is flotsam evidently deposited as a result of tidal activity, including planks of wood which have not rotted to any significant degree, suggesting that the area continued to be affected by tidal activity until relatively recently, perhaps in the last decade or so.

No attempt has yet been made to date the *T. palustris* shells from Ra's Hanjarah, and they could, of course, have been dead for some considerable time. Most, however, are complete, with the exception of the breakage of the tips, in some cases, and they do not appear to have been affected to any significant degree by weathering, although many have a slight reddish tint. It has been suggested by Feulner (*pers.comm.*), based on observations in the Northern Emirates, that the latter feature may come about as a result of shallow burial in a relatively oxidising environment, particularly in a coarse shell bed (a lag deposit), and that the shells in question may have been only recently exhumed. *T. palustris* is usually, but not exclusively, found in association with mangroves (Feulner 2000). No evidence of mangroves formerly being present is visible at the exact location where the shells were found, however, small stands of mangroves *Avicennia marina* are present in the tidal creek at Ra's Hanjarah, a few hundred metres away, as well as being widely spread between Ra's Hanjarah and Abu Dhabi island.

A further series of now-infilled lagoons, with *T. palustris* shells *in situ* in non-archaeological contexts, exists just north of the Abu Dhabi / Dubai border, at Saih ash Sh'aib. This area appears to have a similar history to that of the Ra's Hanjarah area. The coastal lagoons at Saih ash Sh'aib have infilled progressively, satellite imagery clearly showing the full extent of the once extensive embayments system to around 3 km inland of the present-day shoreline. Whether or not mangroves were at that time present at Saih ash Sh'aib is not known, although coring might reveal confirmatory evidence.

Today the lagoons immediately behind the beach at Saih ash Sh'aib have been modified by "borrowing" of material to supply aggregate. The configuration of the inner lagoonal embayments remains clear, however, having once been connected to the Gulf through the area of the new man-made workings, but unaffected by modern-day extraction or other activities. Indeed, the inland supra-tidal flats still occasionally flood on storm tides or following heavy rainfall in winter. Progressive infilling, or perhaps even a catastrophic event, such as a single storm, which blocked the narrow entrance, ultimately spelt the demise of both the lagoons and the population of *T. palustris*. Coring or excavation would be necessary to decipher the evolution and timing of the change in environment here.

Conclusion

The presence of *T. palustris* shells on Late Islamic archaeological sites to the south-west of Abu Dhabi island, and more abundantly to the north-east, coupled with the presence of shells in non-archaeological shoreline contexts on Sadiyat and, particularly, at Ra's Hanjarah and further north-east at Saih ash Sh'aib, suggests that a live population of the species was formerly present in the area. This represents a significant extension westwards of known former populations of *T. palustris* in the Gulf.

The archaeological evidence further suggests that such populations were present in the north-east Abu Dhabi lagoons long after they had disappeared from the Northern Emirates or, at least, after the latter populations had declined to such an extent that they were no longer exploited for food.

These results raise interesting questions for further inquiry. For example, why is it that *T. palustris* seems to have been limited to this relatively small area of the coastline of the Emirate of Abu Dhabi and immediately adjacent areas of

Dubai, at Saih ash Sh'aib? What accounts for its presence here long after its apparent disappearance in the Northern Emirates? What caused the population finally to disappear? And is there still a population of live *T. palustris* somewhere among the mangroves within Abu Dhabi's north-eastern lagoons?

Acknowledgements

The authors are grateful to Gary Feulner both for many useful discussions over the years on the presence - or absence - of *T. palustris* in the Arabian Gulf and for his extensive and valuable comments on early drafts of this paper.

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