

# TRIBULUS



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# TRIBULUS

## NOTES FOR CONTRIBUTORS

TRIBULUS is the Journal of the Emirates Natural History Group and was launched in 1991. The Group was founded in 1976, and over the next fourteen years, 42 issues of a duplicated Bulletin were published.

TRIBULUS is published twice a year. The aim of the publication is to create and maintain in standard form a collection of recordings, articles and analysis on topics of regional natural history, heritage, geology, palaeontology and archaeology, with the emphasis on the United Arab Emirates and adjacent areas. Papers, short notes and other contributions are welcomed from anyone but should not have been published elsewhere. Guidelines are set out below. The information carried is as accurate as can be determined, in consultation with the Journal's Advisory Panel and referees, but opinions expressed are those of the authors alone.

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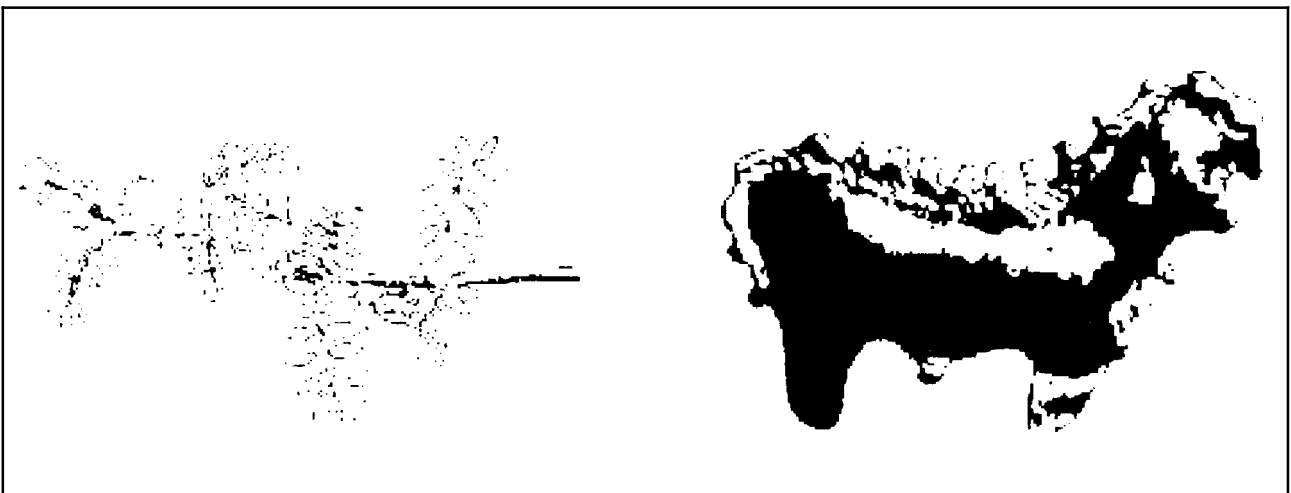
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The plant motif above is of the genus *Tribulus*, of which there are six species in the UAE. They all have pinnate leaves, yellow flowers with free petals and distinctive five-segmented fruits. They are found throughout the country, except in coastal sabkha.

The animal motif above is of a tiny golden bull, excavated from the early Second Millennium grave at Qattarah, Al Ain. The original is on display in Al Ain Museum, and measures above 5 cm by 4 cm.

Manuscripts should be submitted in electronic form, with a printed copy, typed on one side only, and double-spaced. A short abstract should precede the article, with the address(es) of the author(s) at the end. Photographs may be submitted and should be clearly captioned. Line drawings and maps, if not submitted in electronic form, should be in black ink on strong white or translucent paper. References should give the author's name, with the year of publication in brackets, and with the list of articles, showing title and publisher, in date order. Scientific names should follow customary nomenclature in Latin, while the English and, if appropriate, available local Arabic names should also be supplied.

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Front: *Cistanche tubulosa* on Marawah (see p.20).

.....Picture by Simon Aspinall

Back: Water catchment system at Dabb'iya (see p. 5)

..... Picture by Peter Hellyer

The Editorial Board of TRIBULUS and the Committee of the Emirates Natural History Group acknowledge, with thanks, the support of the Group's Corporate members, a full list of whom can be found on Page 4, without whom publication in this format would be impossible. We also acknowledge the support and encouragement of our patron, H.E. Sheikh Nahayan bin Mubarak Al Nahayan, UAE Minister of Higher Education and Scientific Research.

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## EDITORIAL

In the last issue of *Tribulus*, we referred to the suspension of the UAE by the secretariat of the Convention on International Trade in Endangered Species of Flora and Fauna, CITES, and noted the considerable embarrassment that this had caused. We noted, further, that urgent steps had been taken by Government to tackle the issue, and that the trade ban had already been partially lifted.

It is with some pleasure that in this issue we are able to note that the ban has now been effectively removed for most purposes, largely because of the speed with which the Government and other bodies have dealt with what had been, after all, a glaring failing in the country's environmental record.

There are times, on environmental issues, as on others, when quiet and private diplomacy is the best way to proceed, and there are other times when blunt criticism and critical publicity is necessary to bring the necessary attention to bear. The latter has certainly proved its effectiveness on the issue of the implementation of CITES. The rapidity with which Government responded, however, and the genuine concern felt at the highest levels, are to be praised.

The possibility that the UAE might attract criticism because of its flouting of CITES has a matter for quiet and private lobbying inside the country for many years. That lobbying, however, failed to meet with success.

May one hope, perhaps, that out of the experiences of the last year or so, not only will the particular issues related to the trade in fauna and flora be tackled in a determined manner, in accordance with international conventions, but also that the right doors, and ears, will be more receptive in the future to further quiet and private lobbying? Should that come to pass, it will be something not only of benefit for the conservation and protection of the UAE's environment and wildlife, but also for the international image of the country itself as a state concerned with environmental issues.

Since the establishment of the UAE, there has been a formal commitment by Government to environmental conservation and wildlife protection. The first law on the topic is now twenty five years old:

Despite the repeated, and sincere, commitments from President His Highness Sheikh Zayed bin Sultan Al Nahyan on wildlife and environment issues, however, it is no secret that, at lower levels of government, the necessary steps to translate the President's wishes into action were few and far between for the first two and a half decades of the UAE's existence.

In recent years, however, there has been a marked, and successful, stepping up of activities related to

environmental conservation. The creation of the Environmental Research and Wildlife Development Agency, ERWDA, the promulgation of new federal legislation, the carrying out of detailed fisheries research - these, and other steps, have indicated that there is a new determination and seriousness that was previously lacking. One of the most important recent steps, at least in terms of potential, has been the declaration of the country's first large-scale Marine Protected Area, covering over 4,000 sq. km of sea, islands and adjacent mainland around the island of Marawah, west of Abu Dhabi.

Now being managed by ERWDA, the Marawah MPA has already been shown to be of very considerable scientific importance. It contains, for example, the largest population of dugongs in the southern Arabian Gulf as well as some of the most important seagrass beds.

The islands themselves are of significance too - on Marawah itself, for example, is the oldest archaeological site yet identified in the UAE, and many other sites, while geological research has shown that Marawah also contains the most complete sequence of Pleistocene and Holocene geology anywhere in the Gulf.

In planning for the long-term management of the Marawah MPA, detailed scientific studies will be essential, so that the diversity of fauna, flora and habitats can be properly understood, as well as the archaeological, geological and palaeontological aspects.

One of the major papers in this issue of *Tribulus*, not by coincidence, offers a contribution to knowledge of the insect and other invertebrate species to be found on the island of Marawah itself, with two short notes, by the same author, Michael Gillett, supplementing this data.

Further papers on the terrestrial and marine components of the Marawah MPA will be published in future issues of the journal.

The other major paper, by Peter Hellyer, examines the results of archaeological surveys in a part of the UAE even closer to Abu Dhabi, the Dabb'iya peninsula and its adjacent islands, and the Shanayel and Rumaitha areas, less than 50 km. south-west of Abu Dhabi island. The results show clearly that there is a very distinct difference between the nature of human settlement on the islands and on the coastal areas immediately inland of the *sabkha* salt-flats, a difference, moreover, which can be traced over many thousands of years.

Other contributions include notes on a new owl species, an ambidextrous fiddler crab and a new species of sunfish for the UAE.

These and a round-up complete the content in this issue of the Journal. The variety, we hope, will provide something of interest for all of our readers.

### Corporate Members of the ENHG

Production of *Tribulus*, and many of the other activities of the Emirates Natural History Group, including the grant programme of the Group's Conservation Fund, would not be possible without the generous support of the Group's Corporate members, many of whom have provided consistent assistance over many years. The Editorial Board and the Group Committee acknowledge, with thanks, the invaluable support of the following companies and bodies, currently corporate members of the Group, and all past corporate sponsors:

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# Newly-discovered Coastal and Island Archaeological Sites in North East Abu Dhabi

by Peter Hellyer

## Introduction

Since late 1995, the Abu Dhabi Islands Archaeological Survey, ADIAS, has carried out several field surveys in an area south and south-west of the island of Abu Dhabi, investigating parts of the Shanayel and Rumaitha areas on the inland edge of the coastal *sabkhas* (salt-flats), around 30-40 km south of Abu Dhabi, and also the Dabb'iya peninsula, approximately 30 km. south-west of Abu Dhabi and a group of islands to the west of Dabb'iya. Much, though not all, of the work has been undertaken in association with the Abu Dhabi Company for Onshore Oil Operations, ADCO, whose fields of Shanayel, Rumaitha and Dabb'iya underlie much of the surveyed area. These three fields are known collectively by ADCO as the North-East Abu Dhabi Fields.

This paper reviews the archaeological discoveries in this area, and compares the very different nature of the sites found on the peninsula and adjacent islands of Dabb'iya and on the sand dunes and aeolianite outcrops at the inner edge of the *sabkha* in Shanayel and Rumaitha.

## Geography and Geology of the Survey Area

The geographical area herein described as North East Abu Dhabi lies to the west and south-west of the island city of Abu Dhabi, capital of the United Arab Emirates. Shanayel, the smallest and most easterly area, is crossed by the new tarmac highway running south to the

Liwa Oasis village of Hamim, and comprises partly *sabkha* salt flats and partly mobile Holocene dunes and outcrops of Pleistocene aeolianite (fossil sand dunes). It is adjoined, to its west, by the Rumaitha area, which also lies partly under *sabkha*, but extends deeper into the sandsheet south of the inner edge of the *sabkha*. The *sabkha* areas include small plains or 'fingers' extending into the sandsheet, often merging almost imperceptibly into rocky, shallowly-ridged exposures of aeolianite that have been eroded by wind and water down almost to the level of the *sabkha* itself. In the *sabkha* areas, as well as in interdunal plains between the aeolianite outcrops and the mobile dunes of the sandsheet, there are occasional outcrops of an earlier land surface of late Miocene or Pliocene date. These are sometimes eroded almost completely away, but some, locally known as *barqat*, rise to 30 m. or more above the surrounding surface, where they are capped by harder material.

The Dabb'iya area lies north-west of Rumaitha, extending westwards to around 50 km. from Abu Dhabi island. It includes an extensive area of coastal *sabkha*, the tombolo of the Dabb'iya peninsula itself, several low-lying islands comprised mainly of *sabkha* and aeolianite outcrops, of which those of, from the west, Rufayq, Bu Sharah, Qusabi and Bu Qirmah are the most important, and a surrounding area of shallow inshore waters and inter-tidal flats, within which eroded rocky outcrops and low sand banks occur.

While much of the broader Dabb'iya area is today

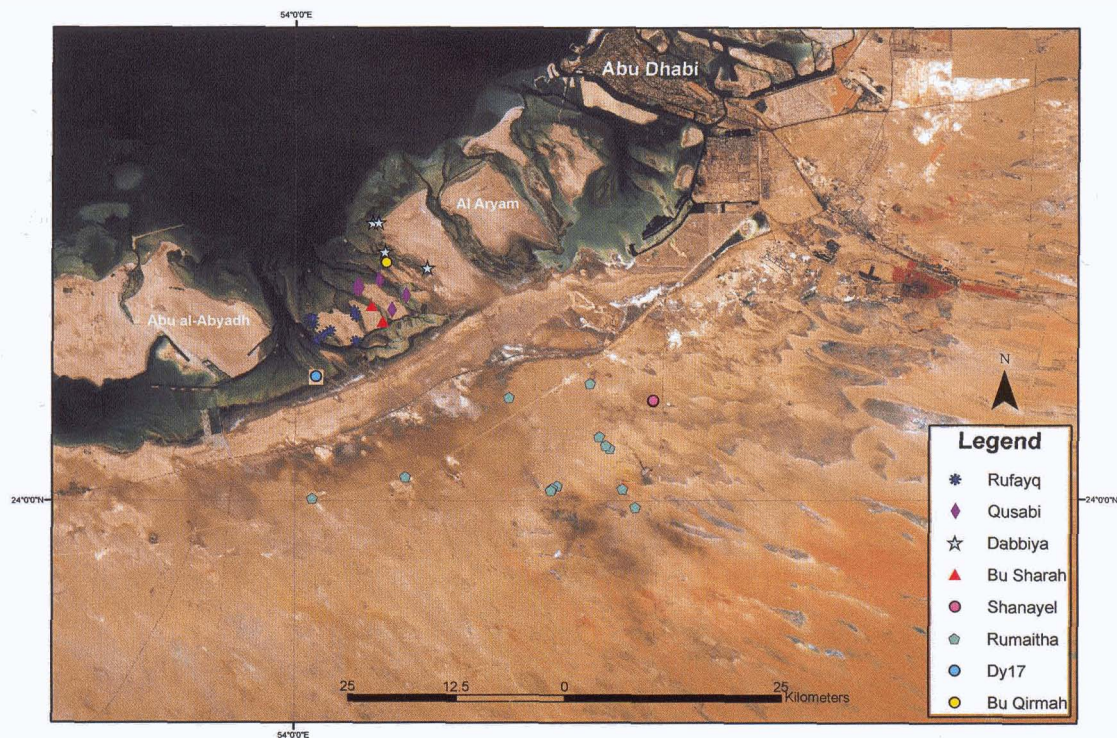


Fig. 1. The Shanayel, Rumaitha and Dabb'iya areas of North-East Abu Dhabi, showing sites mentioned in the text. Map prepared by ERWDA.

*sabkha*, particularly on the Dabb'iyā peninsula itself and on the mainland coastline to the south of the islands mentioned above, it is important to note that the geography of this part of the coastal zone of Abu Dhabi has changed significantly over the course of the past four thousand years or so. Studies of the *sabkha* have suggested that it first began to form around 2,000 BC (1). Prior to that, much of the area would have been shallow lagoons, with some of today's raised outcrops in the *sabkha* being islands. Detectable from satellite photography and, with care, on the ground, a slightly raised ridge running broadly parallel to the present coastline, but a few hundred metres or so inland, represents the old beach that was formed at the time of the peak of the Flandrian transgression in the mid-Holocene, when sea levels were up to a metre or so higher than they are today. Inland of the old beach ridge, the *sabkha* extends to the aeolianite and dunes at its inner edge, over areas which, in some cases, have been deflated as part of the process of *sabkha* formation although, in some areas, the inner edge roughly represents the mid-Holocene shoreline (2). As will be seen, this is of importance in terms of the results of archaeological survey.

As noted elsewhere (3), the *sabkhas* of Abu Dhabi, as strictly defined in geological terms, have thus far failed to yield a single archaeological or palaeontological site, despite considerable study, although such sites have been found on earlier Holocene shorelines or raised Miocene outcrops within the *sabkhas*.

#### Survey results

During an ADIAS baseline study of the North East Abu Dhabi area in late 1998 and early 1999 (4), and

subsequent work, a total of 45 archaeological sites have been identified, along with a further five sites of purely palaeontological interest not discussed here. Of the 45, two were in Shanayel, seven in Rumaitha and 36 in the Dabb'iyā area, including the peninsula and nearby islands.

During the survey work and subsequent analysis of finds, it has become apparent that there is a clear difference between the types of sites, and their date, to be found on the islands adjacent to the Dabb'iyā peninsula and the peninsula itself, on the one hand, and in the Shanayel and Rumaitha areas, on the other. This distinction appears to be directly related to the current geography, as well as to the geography that existed prior to the formation of the *sabkha* salt-flats.

#### Shanayel and Rumaitha

In Shanayel, only two archaeological sites have thus far been identified. Close to each other, on the same interdunal exposure of aeolianite, not far inland from the inner edge of the *sabkha*, they comprise small and loose scatters of Late Islamic ceramics, including pottery of the well-known Julfar horizon. Judging by the number and types of sherds recovered, each probably represent single incidents of occupation, and can be interpreted as the remains of temporary campsites (Plate 1).

In the Rumaitha area, a total of twelve sites have now been identified, although five of these are purely palaeontological in nature. These, including one with vertebrate fossil remains, appear to be Late Miocene in date, (6 to 8 million years ago), but are not dealt with here. All the archaeological sites have been ascribed to periods that pre-date the formation of the *sabkha*. Six yielded lithic artifacts or debitage attributable to the Late



Plate 1. Late Islamic Julfar ware sherds at Shanayel site SN 2



Plate 2. Possible flint dagger from Rumaitha Site RM 9

Stone Age period, which commenced in the United Arab Emirates around 5,500 BC. The seventh site, RM 9, yielded a very fine, but broken, large flint foliate of a type not previously published from South-eastern Arabia (Plate 2). Although the base of the foliate is missing, it has been interpreted as possibly being a flint dagger made as a decorative or ritual object, perhaps copied from a copper artefact during the early Bronze Age, or the late 4th millennium and early 3rd millennium BC, when copper artifacts were rare and highly prized (5). This period, too, preceded the formation of the *sabkha*.

The absence of Late Islamic material in the Rumaitha area is somewhat surprising, since it is close to Shanayel. The failure to identify sites from this period may simply be due to the fact that only limited survey work has been carried out. Moreover, in the deeper sands that comprise the southern sector of the Rumaitha area, sites may have been obscured by sand movement. As noted above, the northern part of the Rumaitha area, where all but one of the sites of archaeological interest were identified, lies adjacent to the inner edge of the *sabkha*, and, therefore, close to what would have been the coast during the Late Stone Age and early Bronze Age. Moreover, both on *barqat* emerging from the *sabkha* (e.g. Barqat Rashid, Site RM-12), and on interdunal plains, there are extensive outcrops of natural tabular or nodular flint, suitable for the making of stone tools. Indeed some of the lithic material present appears to have been made of this locally-available material.

It is suggested, therefore, that this part of what was formerly the coastal zone was utilised by the Late Stone Age population, for hunting or gathering, and, perhaps, for the pasturing of flocks. This period coincided with a 'climatic optimum' around 4,000 BC, or 6,000 years ago, with more rainfall than there is today. As is possibly suggested by the presence of the foliate referred to above, this type of occupation may have extended into the very beginning of the Bronze Age.

No shell middens or other evidence of the exploitation of marine resources has yet been identified in the northern part of the Rumaitha field, with the exception of a single, worn fragment of turtle carapace at Site RM 1. Midden sites are, however, well-known from islands such as Abu al-Abyadh (6), Marawah, Sir Bani Yas and Dalma (7), as well as on the inner edges of the coastal *sabkhas* in the Northern Emirates, such as at Jazirat al-Hamra, in Ra's al-Khaimah (8) and Sharjah (9). There is extensive movement of sand in the Rumaitha area, in contrast to the offshore islands and the Northern Emirates, and middens may well have been covered.

Thus the archaeological record from Shanayel and Rumaitha provides evidence – albeit somewhat scanty – of occupation, or at least an occasional presence, during the Late Stone Age, possibly extending into the early Bronze Age, and in the Late Islamic period, but nothing in between. This is consistent with patterns of occupation or human presence identified by ADIAS survey work throughout the desert zone of the Western Region of Abu Dhabi, between the inner edge of the *sabkha* to north of the Liwa Oasis. Of the fifty or so archaeological sites so far recognised by ADIAS in this broad area, only two can be securely dated to another period, the early to mid-Islamic period, and that only on the basis of less than half a dozen artifacts. Published data on other work in this area has also referred only to the presence of Late Stone Age and Late Islamic material (10).

While the area is large, covering several thousand square kilometres, and much has yet to be surveyed, the absence, thus far at least, of archaeological material from the Bronze Age and Iron Age, and from the Late pre-Islamic and Early to Mid-Islamic periods is striking.

#### The Dabb'iyah area

The archaeological record from the Dabb'iyah area, including both the Dabb'iyah peninsula itself and the

adjacent islands, is markedly different.

The geography and geology of this area differs from that of Shanayel and Rumaitha. In essence, it comprises a number of islands, one of which, the Dabb'iya peninsula itself, is a tombolo which has prograded through sabkha formation until it has become joined to the outer edge of the coastal sabkha behind which Shanayel and Rumaitha lie. These islands are generally low-lying, rising two to three metres above current high water mark, and with extensive areas of near-sabkha lying just above high water mark. In some areas, mainly on the outer, western edges of the Dabb'iya peninsula, are a number of qasasir (sing. Qassar) or zeugen, rock outcrops that represent the eroded remnants of an earlier land surface, comprised of fossilised aeolianite capped by limestone. Such qasasir are also present in adjacent inter-tidal and shallow water areas. Around the edges of the qasasir, and elsewhere, a wave-cut platform provides evidence of a former higher sea level, about 80 cm. above that of today. Geological and geomorphological studies have suggested that this higher sea level occurred around 2,000 BC, thus roughly coinciding with the period when sabkha formation began (11).

To the north, the islands of the Dabb'iya area are bounded by the waters of the Arabian Gulf, while to the south, between them and the mainland, the deep channel of the Khor al-Bazm runs in from the west, (being called the Khor Qantur at its eastern end), and reaching the western sabkha fringes of the Dabb'iya peninsula. Although the peninsula is now linked by sabkha to the mainland, both the higher areas at the outer edge of the peninsula and the islands themselves would have been well offshore prior to the development of the sabkha and the associated slight fall in sea levels. Moreover, the relatively impassable nature of the sabkha itself, until the development of modern roads and tracks,

effectively rendered the area inaccessible, at least for much of the year, except by sea. It is within this geographic context that the archaeological sites of the Dabb'iya area must be viewed.

A total of 36 sites have currently been identified by ADIAS in the Dabb'iya area, including one that has been so heavily disturbed in recent years that no archaeological data can be determined. Of these sites, five are on the Dabb'iya peninsula and a qassar in the adjacent inter-tidal area one on Bu Qimah, 14 on Qusabi, two on Bu Sharah, 13 on the westernmost of the islands, Rufayq, and one on a low sandbank, presumed to be of relatively recent formation, on the southern edge of the Khor al-Bazm, to the south of Rufayq.

Most of the sites on the Dabb'iya peninsula, Bu Qimah and Bu Sharah, as well as that on the sandbank (herein named Dy-17, after the oil well present there), can be dated with confidence to the Late Islamic period, being mainly small scatters near the coastline of Late Islamic ceramics, associated on occasion with mollusc shells (primarily of *Pinctada radiata*, the pearl oyster), and, on Bu Qimah, with a small hearth. One site, on Bu Sharah, Site BS 2, is structural in nature, a small mosque built of local beach rock (*farush*), with its walls surviving to a height of around a metre. It lies on the south-east corner of the island, overlooking the sheltered waters of the Khor Qantur, and could have been approached easily by shallow draught boats. Now abandoned, the mosque is of a type also identified by ADIAS on several other offshore islands, including Marawah, Liffiyah and Sir Bani Yas (12), and it was probably formerly roofed with arish material. Late Islamic ceramics was present nearby.

Also tentatively assigned a Late Islamic date, owing to the associated presence of ceramics from the period, as well as to its relatively good state of preservation, is an intricate water catchment system, Site DB 4, (Arabic



Plate 3. Hearth at Site QS 9



cover illustration), on the surface of a qassar in the inter-tidal area adjacent to the ADCO Dabb'iyah jetty. The system makes use both of the natural contours on the surface of the qassar and of small walls built of locally available stone to guide rainfall into a central depression which has been enlarged by excavation. While many water catchment features have been noted by ADIAS on the islands of Abu Dhabi, this one at Dabb'iyah is notable for the intricacy of its design. It has now been afforded protection by ADCO through the erection of a fence around the qassar and of a warning signboard.

On the edge of a small outcrop in the sabkha on the south-western side of the Dabb'iyah peninsula, and close to the inner end of the Khor Qantur, is Site DB 5, a raised mound with extensive evidence of charcoal, ash and burnt coral and farush. It is interpreted as a hearth, although in the absence of any associated ceramics or radiocarbon dating, no date can be assigned to the site. All of these sites, with the exception of DB 4, DB 5 and BS 2, are interpreted as providing evidence of occasional, perhaps single, use rather than of permanent or seasonal occupation.

While similar sites with small scatters of Late Islamic pottery and pearl oyster and other mollusc shells have also been identified on the remaining two islands, Qusabi and Rufayq, the remainder of the archaeological evidence from these islands presents a significantly different picture of occupation. To some extent this may be due to the fact that more archaeological survey work has been undertaken on these two islands. At the same time, however, it is of probable significance that although they, like the Dabb'iyah peninsula and the other islands, are low-lying, Rufayq and Qusabi do have areas that are of slightly higher elevation. Moreover, these two islands are more easily accessible by sea at all states of the tide. This is particularly true of Rufayq, whose western and north-western coast overlooks a khor that runs from the Gulf into the Khor al-Bazm, between the island and Abu al-Abyadh to the west, and whose southern shoreline overlooks the Khor al-Bazm proper.

Substantially more archaeological work has taken place on Rufayq than on Qusabi, (or indeed anywhere else in the Dabb'iyah area), and it is, therefore, appropriate to deal with this island first.

No evidence of a Late Stone Age presence has yet been noted on Rufayq or elsewhere in the Dabb'iyah area. It should, however, be noted that a single painted sherd of 'Ubaid pottery has been collected on the island of al-Aryam, immediately east of the Dabb'iyah peninsula, while Late Stone Age lithics and possible (unpainted) 'Ubaid period ceramics have been identified on Abu al-Abyadh, immediately to the west of Rufayq (13). A Late Stone Age presence in the area can, therefore, be deduced. At this period, prior to the formation of the sabkhas and at a time of slightly higher sea levels, Rufayq, al-Aryam and Abu al-Abyadh would have been well offshore. Whether or not the Late Stone Age visitors to the Rumaitha area were the same as those who visited the islands cannot be determined, and there is, of course, evidence of maritime commerce in the Gulf at this period, exemplified by the presence of the Ubaid sherds on al-Aryam, possibly Abu al-Abyadh, and, further to the west, on Marawah, Dalma and Ghagha (14).

The next period for which there is evidence of occupation is during the Bronze Age. At two locations on Rufayq, Site RU 2, on the inner edge of the inter-tidal and immediately supra-tidal area on the west coast, and Site

RU 5, on the top of a rocky platform overlooking the north-west coast, a number of stone-lined hearths or firepits have been identified, at least four at RU 2, and at least 23 at RU 5 (15). Similar fire-pits from the islands of Marawah, to the west, and Balghelam (to the north-east of Abu Dhabi island) have produced radiocarbon dates from around the end of the 3rd millennium BC and the beginning of the 2nd millennium BC (16), although this has not been the case with the four Rufayq hearths which have so far been subjected to testing (see below).

In the vicinity of both RU 2 and RU 5, however, ceramics were collected which have been identified as dating to the late 3rd millennium / early 2nd millennium BC period. These sherds, few in number, are early Dilmun period in style and manufacture, of the common red 'Barbar' ware. It has been suggested that these sherds, as well as the dated firepits from Marawah and Balghelam and similar ceramics from Balghelam, may represent evidence of way-stations that were used by the merchants of Dilmun (Bahrain) on their way down the Gulf (17), or, perhaps, merely of visiting fishermen. No other evidence of settlement or of associated tombs of this period has yet been identified in the Dabb'iyah area, although it is possible that some of the undated hearths at RU 5, from where the pottery was collected, may be of similar origin. During the course of study of these two sites, RU 2 and RU 5, charcoal and ash samples were excavated from four hearths, two from each site, for radiocarbon dating. Funding of the dating was undertaken by ADCO, as part of its programme of support for investigations into the archaeology of the field area. Although the associated ceramics were either Barbar ware or of more recent Late Islamic fabrics, the results of the radiocarbon dating provided evidence of occupation at a completely different period.

Three of the hearths, those of RU 2.2, RU 2.3 and RU 5.1, produced a range of dates that fit firmly into the UAE's Iron Age III period (1300 – 800 BC), while the fourth, RU 5.2, produced a date range into the Iron Age II/III period (1100 – 300 BC), and was, perhaps, a little later (18). Iron Age ceramics have been identified by ADIAS elsewhere on Balghelam, north-east of Abu Dhabi, and, closer to Dabb'iyah, Iron Age ceramics have been shown to ADIAS which are said to have come from the island of al-Aryam (19). An Iron Age site with both hearths and ceramics has been identified on the island of Ghanadha, north-east of Abu Dhabi (20), but the Iron Age dating of the Rufayq hearths was somewhat of a surprise, given the absence of ceramics of the same period.

Similar hearth structures, without associated ceramics of any period, have also been identified on both the west and east coasts of Qusabi (Sites QS 6, QS 9 [Plate 37] and QS 10). These have not been excavated and it is not possible, therefore, to assign a date to them.

A series of over fifteen radiocarbon dates have, however, been obtained from such hearth sites on, from east to west, Balghelam, Rufayq, Abu al-Abyadh and Marawah, dating from the end of the 3rd millennium BC into the Late Islamic period. It is possible that the Qusabi hearths, and other such sites, may date to anywhere within this lengthy timespan, although all of the ceramics so far studied from Qusabi can be ascribed a Late Islamic date, as is also probably the case with the coastal shell scatters on the north side of the island.

Ceramics from Rufayq Site RU 6, on the rocky coastal platform that also contains RU 5, included probable Late

pre-Islamic or early Islamic wares. Late pre-Islamic pottery has also been noted on the island of Abu al-Abyadh, to the west (21).

A little south of Sites RU 5 and RU 6, Site RU-3, on a shallow, but shelving, beach, contains an extensive scatter of shells of the pearl oyster *Pinctada radiata* and a widespread scatter of ceramics, as well as modern debris, indicating use until recently. Among artifacts recovered from the site were a cache of sixteen net weights, made of farush, (Plate 4), and a large metal anchor weight, indicating that fishing was among the occupations practiced from this site.

The majority of the ceramics are of typical Late Islamic wares, including Julfar ware from Ra's al-Khaimah, in the Northern Emirates. Among the assemblage are a few



Plate 4 Cache of net-weights from Rufayq Site RU 3

sherds that can be ascribed an earlier date, including two sherds dated to the 15th or 16th Centuries AD, at the beginning of the Late Islamic period (22). The range of ceramics at Site RU 3 covers a broader date range (from the 15th or 16th C. AD onwards) than any other site from the Middle or Late Islamic periods yet identified by ADIAS on the offshore islands of Abu Dhabi, with the exception of the permanent settlement on Dalma, far to the west. It is indicative of occupation, probably seasonal, over a lengthy period. No evidence of structures has yet been identified, while no Islamic graves have yet been found on Rufayq or on any of the other islands within the Dabb'iya area, with the exception of a single grave on Qusabi. There is, however, a small graveyard on the western side of the island of al-Aryam, site AR 4, immediately to the east of the Dabb'iya peninsula.

Other sites within the Dabb'iya area not previously mentioned, as well as on the Dy-17 islet, include scatters of shell and ceramics, often no more than a few shells (Plate 5) or sherds, that can be ascribed a Late Islamic date. While such sites can be found throughout the area,

mainly adjacent to the current coastline, there is a marked concentration, both in terms of the number of sites, and the number of shells or artifacts at each site, on Rufayq, which appears to have been the centre for seasonal occupation of these islands. Insofar as the Dabb'iya peninsula itself is concerned, it should be noted that there was a Late Islamic village, named Bu Khushaishah, on the western side of the island of al-Aryam, immediately to the east of the peninsula, and patterns of settlement and of resource exploitation in this eastern fringe of the Dabb'iya area was presumably focused around that settlement.

The Rufayq sites, also provide by far the greatest range of dates, with all other sites in the general Dabb'iya area being Late Islamic, except, possibly, for some or all of the hearths on Qusabi and Site DB 5 on the western edge of the sabkhas of the Dabb'iya peninsula.

It is reasonable to suggest that this evidence of occupation over a period of around 4,000 years, from the middle Bronze Age to the Late Islamic period, albeit apparently seasonal, is related to the greater ease of access by sea from the north-western and northern coastline of Rufayq. It should be noted, *inter alia*, that although no evidence of extensive settlement, or of water wells or water catchments, has been identified on Rufayq, such evidence has been found on Abu al-Abyadh, to the west, from where the pearl-divers and fishermen who used Rufayq presumably came, (23), well as the small system at Site DB 4, close to the Dabb'iya jetty, and on al-Aryam, to the east (24).

The surveys and other work carried out by ADIAS in North East Abu Dhabi have produced useful information about the archaeology of this part of Abu Dhabi's coastal zone and the inshore islands. There appears to have been a degree of occupation during the Late Stone Age both onshore, on the inner edge of the current sabkha belt, and offshore, although, as noted, here data derives from islands immediately east and west of the Dabb'iya area, rather than in this area itself.

From the Middle Bronze Age onwards until the middle of the 20th Century, however, it is only the islands of the Dabb'iya area which have produced evidence of human activity. Although this may, in part, be due to the obscuring of sites inland by sand movement, or to the fact that survey work has not been evenly distributed, such a pattern is broadly consistent with the results obtained by ADIAS elsewhere on the coast and islands of the Emirate of Abu Dhabi.

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Plate 5. Pearl oyster  
*Pinctada radiata*  
shells on the north  
coast of Rufayq

# A winter survey of insects and other terrestrial invertebrates on Marawah Island, Abu Dhabi

by Michael P. T. Gillett and Conrad P.D.T. Gillett

## Abstract

Representatives of 11 different orders of insects were recorded on Marawah Island, western Abu Dhabi, during a three-day visit to the island in late December 1998. In terms of biodiversity, the two best represented orders were the Lepidoptera (butterflies and moths) and the Coleoptera (beetles). However, in terms of numbers of individuals, the orders Diptera (true flies) and Hymenoptera (bees, wasps and ants) were dominant. Three distinct origins for the insect fauna of Marawah have to be recognised: naturally occurring resident species; introduced and established species and seasonal migrant species. Some insects can easily be assigned to one or other of these groups, but many can not be so readily allocated to a particular group without further study. In addition to insects, representatives of only three other orders of terrestrial arthropods were recorded on the island. These included several species of Araneae (spiders) and one species each of Isopoda (pillbugs and woodlice) and Scolopendrida (centipedes). Although the results represent only a preliminary survey of Marawah terrestrial invertebrates, the results are encouraging enough to suggest that further surveys carried out in spring, summer and autumn would greatly add to the list of species known from the island.

## Introduction

Marawah Island is well known for its rich ornithological

fauna and for its important archaeological sites. It has not apparently been surveyed for insect biodiversity, but the island's crab communities were assessed in 1995 as part of the studies into the ecological consequences of the 1991 Gulf War oil spill (Aspel, 1996). During this study, at least a few insects were collected and Cassola & Schneider (1997) gave records for two tiger beetles (Coleoptera: Carabidae: Cicindelinae), *Lophyridia aulica* (Dejean) and *Salpingophora hanseatica* (W. Horn) from the island. Single specimens of these same tiger beetles from Marawah collected by S. Aspinall, 03/06/1993) are in the collection of the National Avian Research Centre, NARC, (now part of the Environmental Research and Wildlife Development Agency, ERWDA). In order to extend knowledge of the insects of Marawah, the authors visited the island during the period 27-29 December, 1998. Annotated lists of the insects and a few species of other terrestrial arthropods recorded during the survey form the main body of this article. A preliminary report was presented to ERWDA by the authors in January 1999 and the opportunity is taken here to update this to include some revised determinations and a few records that were inadvertently missing from the preliminary assessment.

In total, over 60 species of insects were recorded belonging to 11 different orders. However, this can only represent but a small fraction of the Marawah fauna. Shortage of time caused the authors to concentrate recording activities on the south-eastern corner of the island and the survey was conducted during winter and



at a time when there had been no recent rainfall. It is to be anticipated that more wide-ranging collecting and visits during other seasons would greatly extend knowledge on the biodiversity of Marawah Island insects and other invertebrates.

## Methods employed

### Trapping

On 27 December, 1998, 50 baited pitfall traps were set up in areas adjacent to the guesthouses and airstrip at the south-east corner of the island. Each trap was a plastic drinking beaker emplaced with its rim flush with the surface of the surrounding soil. Half of the traps were baited with 10-15 ml of a fermenting mixture of yeast and asafoetida in water and half with small pieces of meat. The traps were positioned at four localities: just above the tideline at the edge of a patch of mangroves; above the high-water mark along a stretch of sandy beach and at two inland sites amongst sparse vegetation in sandy areas. All traps were inspected and the catch removed early on 28 December. Since the results were not very encouraging, plans to set up more traps were cancelled and the existing traps were finally removed on the morning of 29 December.

### Daytime searching and netting

On each of the three days spent on the island, extensive visual searches for insects were conducted at different points on the island, mainly at the south-east corner, along the south coast and in the middle of the island. Insects were caught in flight or on vegetation, whilst others were obtained by sweeping suitable plants using nets or by turning over wooden boards and other debris.

### Night-time searching and collecting at lights

A few insects were found at night after careful searching with a lantern. Many were found by examining the walls and ground near to electric lights, especially those with fluorescent tubes.

## Annotated Systematic List of Insects

The sequence of the different insect orders given below follows that used in a recent survey of the insects of Jebel Hafit, Abu Dhabi (Gillett, 1998). Listings of different families within the orders are based on the following references: Odonata (Giles, 1998); Neuroptera (Hölzel, 1988); Lepidoptera (Heppner, 1997); Diptera (Chinery, 1986); Hymenoptera (Al-Houty, 1989) and Coleoptera (Lawrence & Newton, 1995). Other key references to the Arabian fauna, where available, are given in square brackets alongside the names of orders and families.

Subclass: APTERYGOTA – wingless insects  
Order: THYSANURA – bristletails and silverfish

Family: Lepismatidae [Irish, 1991]

*Lepismatida* sp.

Adults and nymphs fairly common beneath boards and other debris in the vicinity of buildings and in sandy areas. No identification at generic/specific level is

available.

Subclass: PTERYGOTA – winged insects  
Division: EXOPTERYGOTA – winged insects with incomplete metamorphosis  
Order: ODONATA – dragonflies and damselflies [Giles, 1998]

Family: Aeshidae – hawk dragonflies

*Hemianaxephigger* Burmeister

Immature individuals were common all over the island, patrolling sandy areas at a height of several metres either singly or in small groups of 2-5 individuals.

Family: Libellulidae – darter dragonflies

*Pantala flavescens* Fabricius

Uncommon, this species appeared to be restricted to the margins of mangrove areas where it perches on low vegetation.

Order: ORTHOPTERA – grasshoppers and crickets [Popov, 1980; Gillett, 2000]

Family: Pyrgomorphidae

*Pyrgomorpha conica tereticornis* (Brulle)

Both adults and nymphs, in brown and green forms, were commonly found on herbage, especially on *Heliotropium kotschyi* (Boraginaceae).

Family: Acrididae – short-horned grasshoppers

*Heteracris littoralis similis* (Brunner von Wattenwyl)

Adult specimens of this large grasshopper were widespread on the island wherever there was vegetation.

*Heteracris annulosus annulosus* (Walker)

Both adults and nymphs of this smaller species were fairly common in mangrove areas; the adults flying to nearby saltbushes when disturbed.

Order: BLATTARIA – cockroaches [Grandcolas, 1994]

Family: Blattidae

*Periplaneta americana* Linnaeus

This common cosmopolitan pest species (the American Cockroach) was found at night in small numbers around buildings in the guesthouse area.

Order: ISOPTERA – termites [Chhotani & Bose, 1983, 1991]

Family: Rhinotermitidae – Cyclops termites

*Psammotermes hybostoma* Desneux

This termite was common in sandy areas of Marawah

under boards and driftwood.

**Order: HEMIPTERA – true bugs [Linnavouri, 1986]**

**Family: Pentatomidae – shield bugs**

*Eysarcoris inconspicuus* Herrich-Schaffer

This is a common bug in the UAE, wherever there is vegetation. On Marawah, it was mainly found at night at electric lights. Both green and brown morphs were present.

**Division: ENDOPTERYGOTA – winged insects with complete metamorphosis**

**Order: NEUROPTERA – nerve-winged insects [Hölzel, 1988]**

**Family: Chrysopidae – green lacewings**

*Chrysoperla carnea* Stephens

Usually common in the region, only one example of this lacewing was found on Marawah, at electric light.

**Family: Myrmeleontidae – antlions**

*Myrmeleontida* sp.

Although no adult insects were seen, the conical pits of antlion larvae were common in those sandy areas of Marawah examined.

**Order: LEPIDOPTERA – butterflies and moths [Larsen, 1983; Wiltshire, 1990; Legrain & Wiltshire, 1998]**

**Family: Gracillariidae – leafminer moths**

*Gracillariidae* sp.

The larvae of these small moths mine the leaves of suitable host plants. The family has not been previously recorded from the UAE., but, as for most Arabian "microlepidoptera", identification to species level is difficult. Only one example of this moth was collected by sweeping plants of *H. kotschyi* near to the guesthouse on Marawah Island.

**Family: Pyralidae – snout moths [Gillett, 1997]**

*Crambinae* spp.

Two species of "grass moths" belonging to this subfamily were found on Marawah. The larger of the two was the commonest moth found at electric lights on the island and was also encountered during nocturnal searches with a lantern away from the built-up areas of the island. Only a few examples of a different and smaller species were observed, also at light near the guesthouse.

*Nomophila noctuella* (Denis & Schiffermuller)

Two examples of this regionally common and cosmopolitan moth were found at electric lights in the built-up area of the south-western corner of the island.

*Cornifrons ulceratus* Lederer

This moth was also quite common on Marawah, with five examples captured at electric lights.

*Pachyzancla phaeopteralis* Guenee

This is another regionally common moth, occurring in the UAE during the cooler months of the year. It can often be found during the day by disturbing clumps of vegetation and is also readily attracted to electric lights at night, a situation in which a single example was found on Marawah.

**Family: Pterophoridae – plume moths**

*Agadistis* sp.

A number of species from this family are found in the UAE during the cooler months. Unlike typical members of the family, moths of the genus *Agadistis* lack the typical plumed wings, but they do share the characteristic long spurred legs common to other genera. Only a single example was found at electric light.

**Family: Papilionidae – swallowtail butterflies**

*Papilion demodeus demodeus*

This species, the Lime butterfly, although common in the UAE and elsewhere in eastern Arabia, is not considered to be a native species, but rather an introduced species from western Asia since the larval food plants (*Citrus* spp.) are themselves not indigenous to the region. Two examples of this large and colourful butterfly were seen flying around gardens and probably point to the presence of cultivated lime trees on the island.

**Family: Pieridae – yellow and white butterflies**

*Colotis calais amatus* (Fabricius)

*Colotis phisadia phisadia* (Godart)

The larval food plant of these two closely related butterflies is *Salvadora persica*, which is now very commonly planted throughout the UAE. Accordingly, both the small salmon Arab *C. calais* and the blue spotted Arab *C. phisadia* have become increasingly common butterflies in recent years. On Marawah, both species were common and frequented flowers of *H. kotschyi* as well as bushes of the larval food plant. There is a previous unpublished record of large numbers of *C. phisadia* associated with *S. persica* on another offshore island (Sir Bani Yas, November, 1993 – MPTG).

**Family: Lycaenidae – gossamer-winged butterflies**

*Tarucus balkanicus* (Freyer)

The Balkan pierrot is a relatively common butterfly on the mainland UAE, where it is associated with *Zizyphus* trees (especially *Z. nummularia*). Male butterflies can be distinguished from males of the commoner Mediterranean pierrot *T. roseacus* but the two females

are difficult to tell apart. On Marawah Island, about half a dozen males were found on flowers of *H. kotschyi*, but no suspected females were seen.

*Zizeeria karsandra karsandra* (Moore)

Another widespread species in the UAE, the Asian grass blue is known from other offshore islands including Sir Bani Yas (MPTG) and Das (R. Western) (*unpublished records*). On Marawah, this butterfly was common in areas with a mixed covering of herbs and grasses and was seen to visit flowers of *H. kotschyi*.

*Brephidium exilis* (Boisduval)

The curious story of this apparently recently introduced American butterfly (the Western Pygmy Blue) into the UAE and neighbouring countries, including its occurrence on the offshore islands of Abu Dhabi is covered in an accompanying note (Gillett, 2002). In December 1998, only a single butterfly of this species was found on Marawah, but likely larval food plants occur on the island, suggesting that the butterfly may be able to sustain its presence either temporarily or permanently.

**Family: Nymphalidae – brush-footed butterflies**

*Danaus chrysippus chrysippus* (Linnaeus)

Widespread and common in the UAE, the Plain Tiger is a well known migrant with a vast range including the Middle East, Asia and Africa. Larval foodplants belong to the family Asclepiadaceae, including *Calotropis procera*. Although no individuals of this plant were noted on Marawah, it may occur. Only one male butterfly was noted.

*Vanessa cardui cardui* (Linnaeus)

The Painted Lady is another noted migrant with an even greater range than the Plain Tiger covering most regions except South America. The species is particularly common during the winter months in the UAE and the single specimen found on Marawah at flowers of *H. kotschyi* probably represented one of the first of many potential arrivals on the island.

*Junonia orithya here* (Lang)

Also a well known migrant, this species, the Blue Pansy, was present in numbers on Marawah, frequenting flowers and also sunning themselves on the ground and on the walls of buildings.

**Family: Lasiocampidae – eggar moths**

*Streblote siva* Lefèbvre

This is a common migratory moth whose larvae are polyphagous. It occurs mainly during September to December in the UAE and is the commonest member of the family in Arabia. Only one example was found at light in the jetty area on the south-east corner of the island.

**Family: Spingidae – hawk moths**

*Hyles livornica livornica* Esper

Seven members of the hawk moth family have been recorded in the UAE. All are powerful fliers and strong migrants. Many species have been noted as coming on board ships far out to sea and all seven species could potentially reach the offshore islands of Abu Dhabi. However, only two examples of the striped hawk moth *H. livornica* were recorded on Marawah, being found at light.

**Family: Noctuidae – owlet moths**

*Spodoptera exigua* (Hügnér)

A common migratory moth in the UAE during the winter months, this species has been recorded from Das Island (R. Western, *pers. comm.*). The larvae are polyphagous and the species is a minor pest throughout the Middle East. Only small numbers were recorded on Marawah.

*Trichoplusia ni* (Linnaeus)

A single specimen of this common migratory moth was found at light on Marawah. It occurs throughout the Middle East.

**Order: DIPTERA – true or two-winged flies**  
**[Chinery, 1986]**

**Family: Tabanidae – horseflies**

*Eumenus turcomenorum* Paramonov

Several species of these biting flies occur in the UAE, but, like most groups of flies, they are not well known. This particular species has also been recorded from Kuwait (Al Houty, 1989). A single specimen was collected along the southern shoreline of Marawah.

**Family: Empididae**

*Empididae* sp.

A single specimen of an unidentified member of this family was found by sweeping vegetation near to the guesthouse on the south-east of the island.

**Family: Syrphidae – hoverflies**

*Metasyrphus luniger* (Meigen)

One example of this large, brightly coloured hoverfly was seen at the edge of mangroves near the guesthouse.

*Eristalinus* sp.

Drone flies belonging to this genus are common in the UAE. On Marawah, small numbers were encountered on flowers, especially those of *H. kotschyi*.

**Family: Drosophilidae – false fruit flies**

*Drosophila* sp.

These cosmopolitan flies are attracted to over-ripe fruit and fermenting liquids. Several examples were found indoors and another was swept from vegetation in the built-up area.

**Family: Calliphoridae – flesh flies,  
bluebottles, greenbottles**

*Wohlfartia nuba* (Wiedemann)

This is one of the commonest pestiferous flies on the island and is strongly attracted to humans, often attempting to imbibe moisture from the eyes and mouth.

*Lucilia serricata* Meigen

This bright green species was common around the built-up parts of the island.

*Chrysomya regalis* Robineau-Desvoidy

Only one example of this generally common bluebottle was found on Marawah on flowers of *H. kotschyi*.

**Family: Muscidae – houseflies**

*Musca domestica* Linnaeus

As expected, the housefly was the commonest fly around habitation on the island. both indoors and outdoors.

**Order: HYMENOPTERA – bees, ants, wasps  
[Al Houty, 1989]**

**Family: Colletidae – plasterer bees**

*Chalicodoma* sp.

No social bees (*Apis* spp.) were seen on the island, but a small number of solitary bees were observed on flowers of *H. kotschyi*, including one member of this genus. The brood cells of these bees are constructed of mud and clay and affixed to rocks and walls. Light-coloured cells of this type were common on buildings on Marawah and possibly belong to this bee.

**Family: Formicidae – ants [Collingwood, 1985;  
Tigar & Collingwood, 1993]**

*Pachycondyla sennaarensis* (Mayr)

*Camponotus xerxes* Forel

*Cataglyphis niger* (André)

Ants were collected in large numbers in baited traps emplaced for obtaining Coleoptera. The three species above are all common in the UAE. The ant fauna of both the mainland and the islands requires a great deal more work as this group of insects has been very poorly recorded. The extensive list of species found in Saudi Arabia suggests that many more species will be found to occur both on the UAE mainland and the islands.

**Family: Sphecidae – digger wasps  
[Guichard, 1986, 1988, 1989]**

*Bembix* sp.

Many species of these large wasps are found in the Arabian Gulf region, including a number first described

scientifically from UAE material. The present species was common on flowers of *H. kotschyi*.

*Podalonia tydei* (Le Guillou)

This is one of the commonest digger wasps in the UAE where it is found on flowers and hunting caterpillars in sandy regions. Several examples were found on Marawah on flowers of *H. kotschyi*.

*Ammophila rubripes* Spinola

This species is similar to *P. tydei*, but slighter in build and less common. Only a single specimen was found.

**Family: Ichneumonidae – parasitic wasps  
[Horstman, 1981]**

*Ichneumonida* sp.

Most groups of parasitic wasps are very poorly known for Arabia, and ichneumonids are no exception. Only a single example of a black species of this family was found, being inadvertently swept from vegetation during the netting of a butterfly.

**Order: COLEOPTERA – beetles**

**Family: Carabidae – ground beetles [Balkenohl]**

*Calasoma (Campalita) imbricatum* Klug

At least two species of these large migratory beetles are common in the UAE where they appear in the winter months after rains. Both adults and larvae prey on the caterpillars of certain moths. One example was found on Marawah, attracted to light in the housing compound.

*Scarites subcylindricus* Chaudoir

This is a common beetle in the UAE, but only in wet places, including irrigated areas. Unlike most other ground beetles, *Scarites* species live in burrows in damp ground, appearing on the surface at night to hunt other insects and invertebrates. This species is much smaller than the common coastal species in the Gulf region, *S. guineensis*. Only a single specimen of *S. subcylindricus* was found on Marawah, under a piece of wood alongside a mangrove thicket.

*Harpalus (?) caiphus* Reiche

This small ground beetle is common in the UAE and is often attracted to lights. It is probably phytophagous, unlike most ground beetles which are carnivorous. Only a single example was found on the island, at light.

*Sphodrus* sp.

This is an uncommon and enigmatic beetle on the UAE mainland, being found rarely at electric lights. Unlike many ground beetles, this species is capable of flight and is probably migratory. Only a single example was seen.

*Anthia duodecimguttata* Bonelli

This large and attractive ground beetle is common



throughout much of Arabia, including the UAE. It is usually nocturnal and frequents sandy areas on otherwise rocky slopes or on gravel plains. A single example was found inland on Marawah Island on sandy ground near to rocky outcrops.

Family: Dermestidae – hide beetles  
[Mroczkowski, 1979]

*Dermestes frishi* Kugelmann

This is the commonest beetle found on carrion in the UAE, both in sand desert and on gravel plains. On Marawah, a single dead individual was found under a plank on sandy ground.

Family: Tenebrionidae – darkling beetles  
[Kaszab, 1981, 1982]

*Prochoma (Oxypistoma) bucculenta* Koch

This beetle has an interesting distribution, being known from eastern Saudi Arabia and the tip of the Musandam peninsula. This is the first published record from the UAE although it is also known from Ain al Faydah, Al Ain (MPTG – pers. obs.). These discoveries in the UAE, in between the previously known localities, fit well with the assumed dispersion of the species from the area of modern-day Iraq some 25,000 years ago (Carl, 1994). Marawah specimens were collected from baited traps in a sandy area near the beach on the eastern side of the island.

*Mesostena (Mesostena) puncticollis* Solier

This is one of the commonest of all Arabian beetles, occurring under boards and debris on sandy ground. It was repeatedly found thus on Marawah as well as in baited traps set in similar areas.

*Trachyderma philistina* Reiche & Saulcy

This is another common Arabian species, which was found in baited traps on Marawah.

*Thriptera kraatzii* Haag-Rutenberg

Similar to the preceding species, this common darkling beetle was found in baited traps set at the edges of *sabkha* areas.

*Blaps kollari kollari* Seidlitz

This large beetle was common on Marawah, both around housing and in open country, where it was collected in baited traps.

*Gonocephalum besnardi* Kaszab

*Gonocephalum prolixum inornatum* (Erichson)

Single examples of each of these two generally common species were found on the ground near the built-up area of south-east Marawah.

*Opatroides vicinus* (Fairemaire)

This is a common and often gregarious species in the

UAE, where it is found in towns as well as open country. Only a single example was taken in this survey – under a wooden board near to buildings.

*Phaleria (Epiphaleria) prolixa* Fairemaire

Members of this genus are typically found on sandy beaches throughout the warmer regions of the world. They are inter-tidal scavengers and the present species was taken in numbers along the beach on the east side of the island.

*Cataphronetis subclavata* (Woolaston)

This species is found outdoors, but is related to beetles of the genus *Tribolium*, which are pests of stored cereals. On Marawah, the beetle was extremely common around a large rubbish dump some distance inland from the built-up area in the south-east and was also taken in carrion traps.

Family: Scarabaeidae – dung beetles, chafers and rhinoceros beetles [Enrodi, 1980]

*Oryctes agagemnon arabicus* Fairemaire

This rhinoceros beetle has become very common in UAE plantations and gardens and is often associated with date palm cultivation. Several dead specimens were found on Marawah amongst date palms, two live examples being obtained at electric lights nearby.

*Pentadon algerinum dispar* Baudi

This beetle has similar habits to the preceding species and a single example was taken at light in the same situation.

### **Annotated Systematic List of Other Invertebrates**

Although the main objective of the present study was to survey and record insect species, some observations were also made of other terrestrial invertebrates such as spiders, centipedes and woodlice, although the total number of species found was quite small.

Class: ARACHNIDA  
Order: ARANEAE – spiders

Family: Argiopidae – orb-web spiders

*Argiope* sp.

Only a single immature example was seen in a mangrove bush with a web of approximately 20 cm diameter.

Family: Agelenidae – house spiders

*Agelenidae* sp.

A single spider referable to this family was recovered from a baited pitfall trap set in sandy ground besides mangroves.

Family: Thomasidae – crab spiders

Thomasidaesp.

Several specimens of these spiders were present on mangrove leaves on the island.

Class: CHILOPODA – centipedes  
Order: SCOLOPENDRIDA – scolopendromorph centipedes [Lewis, 1986]

Family: Scolopendridae

*Scolopendra mirabilis* (Porat)

This large centipede was common under debris above the tide-line on the east coast of the island.

Class: CRUSTACEA – crustaceans  
Order: ISOPODA – pillbugs and woodlice [Taiti & Ferrara, 1991]

Family: Tylidae

*Tylos maindroni* Giodarno Soika

This isopod was very common on sandy ground adjacent to mangrove thickets. On the south side of the island several dozen examples could be found underneath a single piece of wood. At night, they were strongly attracted to carrion traps and others were found climbing walls and appeared to be drawn to electric lights.

## Discussion

The total number of extant insect orders, although largely a matter of opinion amongst scientists, is generally accepted as being around 30. In a forthcoming national review (Gillett & Gillett, unpublished), 23 orders are recognised from the UAE. In the present survey of Marawah Island, only 11 orders were recorded. However, far from being a disappointment, these results suggest that insect biodiversity on the island is considerable, given the restricted nature of the survey and its execution during the winter season. In fact some of the orders recorded from the UAE are known from only one or a few species (e.g. Ephemeroptera and Phasmida) or occur in mountain/running water habitats not found on the offshore islands (e.g. Trichoptera). There are several orders that almost certainly will be eventually found on Marawah Island that are unrecorded here; these include Dermaptera (earwigs), Homoptera (plant lice and aphids), Mantodea (mantises) and Thysanoptera (thrips), amongst others.

Further visits to Marawah Island at different times of the year together with surveys covering more fully the whole area of the island and improved techniques (e.g. mercury vapour lamp trapping) will all be expected to add many more insect and other arthropod species to the present list. Of the orders currently listed, the predominance of Lepidoptera (20 species) and Coleoptera (18 species) is unsurprising. The other two major orders, Diptera and Hymenoptera, were represented by far fewer species (9 and 8 respectively), but in terms of numbers of individuals, these groups dominate due largely to the

large number of nuisance flies (*Musca domestica* and others) and ants. The latter were almost certainly under-recorded in the present survey, just as they are under-recorded for the UAE as a whole.

Although many more insects will eventually be recorded from Marawah, the present list clearly suggests that these insects can be grouped into naturally occurring permanent species (e.g. the shield bug *Eysarcoris* inconspicuus, the darkling beetles *Phalaris prolix* and *Cataphronetis subclavata* amongst others), migratory species that are temporarily present on the island (e.g. dragonflies, most butterflies and moths and the beetles *Calasoma imbricatum* and *Sphodrus*) and introduced species that depend upon human activities and cultivation (*Periplaneta americana*, *Musca domestica*, *Oryctes agamemnon*, *Pentadon algerinum* etc.). However, not all insects can be neatly fitted into these categories (e.g. most flies and winged hymenopterans) and further studies will be required to place them.

## Acknowledgements

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# Occurrence of the Western Pygmy Blue butterfly *Brephidium exilis* [Boisduval] on offshore islands of Abu Dhabi, including Marawah Island (Lepidoptera: Lycaenidae)

by Michael Gillett

The four described members of the genus *Brephidium* (Scudder) are amongst the world's smallest and least conspicuous butterflies, having an interesting natural distribution that is restricted to southern Africa and the Americas. A single species, the Tinkinkie Blue *B. metophis* Wallengren, is known from southern Africa (Pringle et al, 1994). Two other species are found in the southern USA, although one extends its range southwards into Central and northern South America (Opler et al, 1995). The Eastern Pygmy Blue *B. isophthalma* [Herrich-Schaffer] is found from the Atlantic coastal plain of South Carolina, around both coasts of the Florida peninsula and westwards along the Gulf Coast to Louisiana and Texas. The Western Pygmy Blue *B. exilis* [Boisduval], (syn. *B. exile*), is wider ranging and occurs from central California both eastwards to Nevada, Arizona, New Mexico and Texas and southwards into Mexico and Venezuela. The fourth species, *B. thompsoni* Lewis and Carpenter, is recorded from the Cayman Islands, but is poorly known (Savela, 2002).

The discovery of a species of *Brephidium* in large numbers in the UAE at Tawam Medical Campus, Al Ain, Abu Dhabi Emirate in April 1998 came as a bit of a sensation (reported in Emirates News, April 23, 1998), but it was soon realised that, rather than being a new species, the butterfly was *B. exilis* (Gillett, 1999); this being subsequently confirmed by a specialist (Torben Larsen, pers. comm.) It was also realised that the butterfly had been introduced into the region perhaps either with plants used for landscaping or during the military buildup at the time of the Gulf War. Subsequently other regional records for the occurrence of this butterfly were quickly established, including Buraimi and Mahdah in Oman and Dubai in the UAE, both on Bur Dubai (Gary Feulner, pers. comm.) and Deira sides of the Creek. Even more interesting was a report of very large numbers of an unidentified lycaenid butterfly in flower beds in May 1998 on Das Island (Rob Western, pers. comm.) This report was accompanied by several specimens of the butterfly in question, which were duly identified as *B. exilis*. Confirmation of the presence of this butterfly on offshore islands of Abu Dhabi was obtained when a

single specimen was netted on Marawah Island in late December 1998 during a survey of the invertebrate fauna (Gillett and Gillett, 2002). Since the first year that *B. exilis* was noted in the UAE, there have been regular sightings at Al Ain, Abu Dhabi, Dubai and Al Faqa in the UAE and Buraimi and Mahdah in Oman. In contrast to the occurrence of *B. exilis* in Al Ain and Das Island in 1998, when hundreds of specimens were routinely observed, in recent years only small numbers of individuals have been seen. This suggests that the initial sightings occurred at a time of population explosion and that the species has now achieved some sort of ecological balance in its new environment. The butterfly has not been noticed in the Hajar Mountains, either in the UAE or Oman, perhaps because it is not adapted to mountainous terrain. No further reports have been made from the offshore islands, but as on the mainland, it is quite probable that small numbers are still present.

The regular larval food plants of all *Brephidium* species are plants of the goosefoot family (Chenopodaceae) including Goosefoot *Chenopodium album* and saltbushes (*Atriplex*, *Salsola* etc.), but *Petunia* (Solanaceae) has been recorded as the food plant of *B. exilis* in California (Coolidge, 1924) and sea purslain *Sesuvium verrucosum* (Aizoaceae) is listed in the same context by Savela (2002). Adult butterflies of this genus visit a wide variety of flowers and feed on nectar. In Al Ain, Buraimi and Dubai, *B. exilis* was mostly found around beds of the introduced *S. verrucosum* exposed to bright sunlight, often feeding from the small red flowers. Use of this plant for landscaping is now extensive in Al Ain and elsewhere in the UAE. On Das Island, the butterfly was frequenting a related native plant (*Mesembryanthemum nodiflorum*). It seems very likely that both of these members of the family Aizoaceae may act as larval foodplants in the UAE, but larvae have yet to be found. The butterfly has also been noted associated with *Chenopodium album* at Tawam, (Al Ain), and with various halophytes from the same family at Mahdah (Oman) and Al Faqa (north of Al Ain).

Since members of the Chenopodaceae are common throughout the Arabian Gulf region and in neighbouring



Western Pygmy Blue Butterflies (upperside) \* male (left) and female (right)

regions, *B. exilis* may expand its introduced range considerably. Although very small and its flight appears weak, this butterfly is a known overland migrant in the USA, where it occasionally reaches Arkansas, Nebraska and Oregon from its western strongholds (Opler et al, 1995). That it can migrate across water too is clearly shown by its appearance on Marawah and, especially, Das Islands so soon after its discovery on the mainland. Such islands could act as staging posts to allow the butterfly to reach Iran and other parts of South-west Asia and indeed, breeding also appears possible on the islands either on introduced plants or on indigenous Chenopodiaceae or Aizoaceae.

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## Grazing of the parasitic plant *Cistanche tubulosa* (Orobanchaceae) by mountain gazelles *Gazella gazella* on Marawah Island

by Michael Gillett

In December 1998, during the course of surveying the mainland-facing shoreline of Marawah Island for insects and other invertebrates (Gillett & Gillett, 2002), abundant clumps of the parasitic flowering plant *Cistanche tubulosa* (Desert Hyacinth) were noted. This conspicuous plant with its large spikes of purple-tinged, bright yellow flowers is common elsewhere in the UAE in the Liwa and Al Ain regions, as well as along the Arabian Gulf coast and inland saline depressions north from Abu Dhabi to Ra's al- Khaimah. Although its occurrence on the offshore islands of Abu Dhabi, including Marawah Island, was not indicated by Western (1989), it can be common on islands, such as Balghelam and Abu Dhabi island itself, where it is most frequently found on the north-east shoreline (Hellyer, Aspinall, pers. comm.). Elsewhere in Arabia, *C. tubulosa* is also common, including in Saudi Arabia, where two further species of *Cistanche* also occur (Collenette, 1985).

On the southern side of the island of Marawah, facing the Khor al-Bazm, the beach usually slopes gradually and halophytic plants dominate just above the tideline. Halophytes known here include *Arthrocnemum macrostachyum* and *Salsola baryosma* (both Chenopodiaceae - goosefoots). Clumps of *C. tubulosa* were usually located nearby on the beach below and underneath these goosefoots, which almost certainly represent the host plants of the parasite (Western, 1989). Surveys along the north shore of the island, facing the Arabian Gulf, at the same time, did not reveal the presence of *C. tubulosa*. This high-energy shoreline is exposed to strong wave action and is heavily littered with jetsam (glass bottles, timber, plastics, cans and animal remains), being dominated very often by grasses and mostly lacking suitable host Chenopods.

Many of the clumps of *C. tubulosa* on the southern side of Marawah had been heavily grazed. Some flower

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spikes had been only half-eaten, but others had been grazed to ground level and in a few cases, pre-emergent spikes and other underground parts of the plants had been exposed and consumed. Abundant hoof-prints and tracks of mountain gazelles *Gazella gazella* were obvious around and leading to grazed plants. Marawah Island hosts a small number of introduced mountain gazelles and two of these were observed on this day several hundred metres from the shoreline. Others were seen on the previous day at the centre of the island, but none were noted on its north-facing side.

The flowering season of *C. tubulosa* in the UAE extends throughout the cooler months (December-March) (Western, 1989) and the present observations suggest that this plant may form a significant part of the winter diet for introduced gazelles on Marawah Island, and perhaps also for other gazelles on the UAE mainland.

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# A report of the slender sunfish *Ranzania laevis* (Pennant, 1776) from the UAE East Coast

by Philip Iddison

The author purchased a specimen of a member of the sunfish family, Molidae, in Al Ain *Souq as Samak* (fish souq) on 29th March 2002. The market trader, Ghulam Mahboob Kureishi, had obtained the fish in the Fujairah market and reported that it had been caught two and a half hours journey out of the port of Khor Fakkan, Emirate of Sharjah, in the Gulf of Oman. Details of the precise location of the catch were not available, but presumably lay within the Exclusive Economic Zone, EEZ, of the United Arab Emirates, unless the fisherman was well to the south, in Omani waters.

The fish had been netted with other large fish, including tuna. The market trader also reported that the fishermen had caught a similar and larger specimen, estimated to weigh 40 kg, about six months previously.

The fish was positively identified as *Ranzania laevis* (Pennant, 1776), the smallest of the four members of the Molidae, by reference to the FAO Fishbase website (1). The family belongs to the order Tetraodontiformes which also includes the well-known trigger-fish and puffer-fish families. There have been several reports of *Mola mola*, the ocean sunfish in the UAE press over recent years (2). This is the largest true bony fish in the world: specimens have been reported up to three metres long and weighing up to 3,000 kg. In contrast, the slender mola or slender sunfish was modest in size being 58 cm overall length, 54 cm standard length, body height 28 cm, overall height 52 cm, head length 22 cm and body depth 9cm. It weighed a little over 6 kg. It is believed to be the first record for the United Arab Emirates.

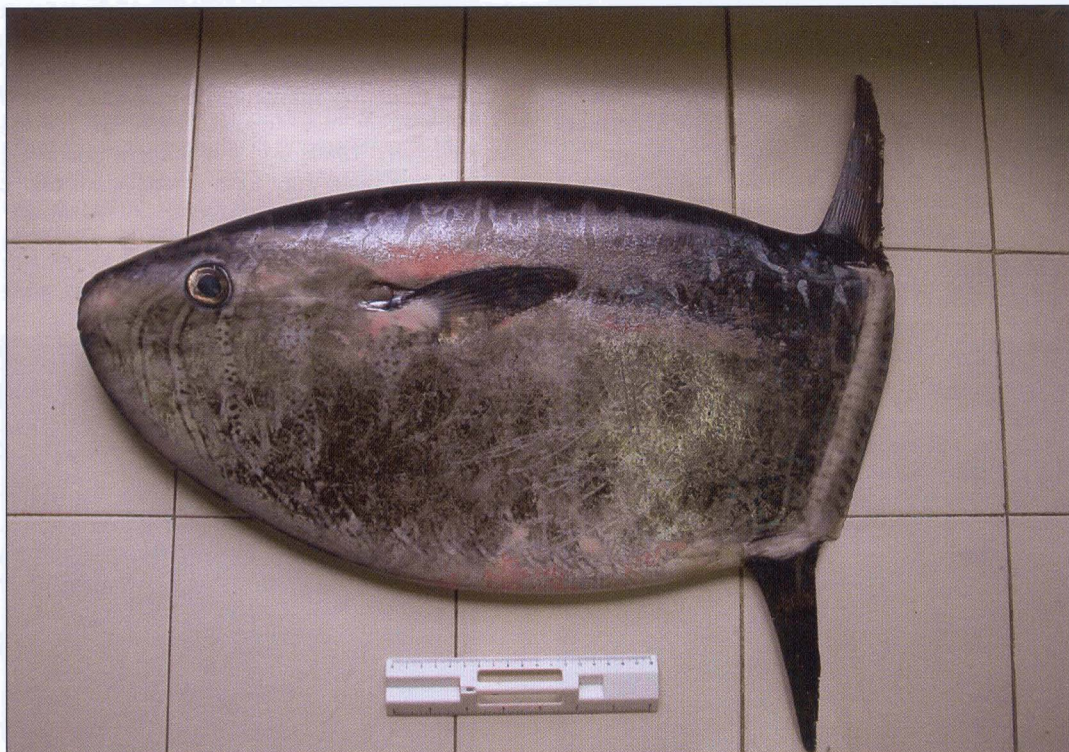
The fish is found in all temperate and tropical oceans and is epipelagic, solitary and rare. The nearest record

traced to date is for Kuwait waters (3) and there are reports for Mumbai, India and Sri Lanka (4), Mauritius and South Africa (5).

The specimen had been kept on ice for two days prior to purchase, resulting in some fading of colour and markings. The characteristic colours and markings were, however, discernible, in particular the iridescent vermicular markings on the posterior dorsal surface. The paired facial stripes with dark spots between the stripes were also evident. Fin ray counts were in accordance with the FAO guide. There were no discernible scales and the skin was relatively smooth. There was no evidence of external parasites which are recorded as common with this family. One internal parasite embedded in the flesh was noticed.

The overall shape of the fish is very characteristic of the family, appearing to consist of a head, very short body and no tail. The fish is not flexible and the skin is very thick and rigid with pronounced dorsal and ventral thickening. The mouth is permanently open, having a vertical oval shape, and is guarded only by fused bony plates. The gill opening is a small spiracle-type aperture with a skin flap practically closing it. The pectoral, dorsal and anal fins and the clavus which replaces the caudal fin are the only mobile parts of the body. The skin forms an external monococque structure and as a result the internal bone structure, in particular the spine, is relatively light for a fish of this size.

The specimen was partially dissected. It was sexually mature with a well developed roe. The texture of the roe was quite smooth and firm and the specimen was possibly a female. The fecundity of the family (with *Mola*



Slender sunfish *Ranzania laevis*

mola producing up to 300 million eggs) could indicate a small egg size. The gut contained a light green paste of digested food. The outer layer of white muscle tissue was loosely structured, parting readily from the underlying dark red muscle which adhered to the backbone. The white muscle tissue also flaked apart very easily and was connected by a series of tendons to the dorsal and anal fin rays to provide powerful fin movement to propel the fish. The heart was located in the bottom of the head and was almost spherical and relatively large. The liver was also quite large and multi-lobed. The blood in the specimen had clotted.

The flesh has a high water content, this confirmed when samples were baked, producing an almost equal volume of liquid. The flesh was, as a result, rather dry on the palate but had a good flavour when sampled in small quantities.

### Acknowledgement

Thanks are due to Dr. Mark Beech who assisted with references and comments.

Interesting or unusual fish noted in the United Arab Emirates should be reported to:

Thabit Zahran Al Abdessalaam, Marine Environment Research Centre (MERC), Environmental Research and Wildlife Development Agency (ERWDA), PO Box 45553, Abu Dhabi, UAE  
Telephone: +971 2 6934661, Fax: +971 2 6817353  
E-mail: tabdessalaam@erwda.gov.ae

### References

1. The FAO Fishbase website at <http://www.fishbase.org> This has an extensive database of marine fish species.
2. Reports in the newspapers have identified two positive records of *Mola mola*:
  - a) Mussafah dockyard, 300-350 kg *Mola mola* specimen,

stranded in January 1999 reported in *Gulf News* 6/1/99 and 7/1/99 and in *Emirates News* 7/1/99.

b) Off Dibba, 500 kg specimen netted in March 1993, identified as *Mola ramsayi* in the report in *Tribulus* 4.1 (Al-Ghais 1994). However, the photograph of the cast of the fish clearly shows the definite line at the posterior of the body where the rough scales on the skin change from extremely coarse to very fine which is one of the identifying characteristics of *Mola mola* according to the Australian Museum website <http://www.amonline.net.au>.

Additionally there are anecdotal references to specimens from Ra's al-Khaimah Emirate in late 1997 and the Fujairah coast in late 1998.

3. Two specimens from Kuwait waters of very similar size are reported by Al-Baz *et al.*

4. Kar *et al.*

5. FAO Fishbase website.

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Australian Museum website, <http://www.amonline.net.au>  
Food and Agriculture Organisation, Fishbase website, <http://www.fishbase.org> <<http://www.fishbase.org>>

Kar, S, R. Chakraborty, S. Mitra & TK Chatterjee, "First Record of the Sunfish *Ranzania laevis* (Pennant) (Pisces: Osteichthyes: Perciformes: Molidae) from the West Bengal Coast." *Journal of the Bombay Natural History Society*, 97(2), August 2000.

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*Partial dissection showing the two muscle masses behind the light backbone, intestine and roe.*

# An ambidextrous fiddler crab

by Peter Hogarth and Mark Beech

Anyone who has spent time in mangrove habitats will have been struck by the abundance of colourful little fiddler crabs (*Uca*), several species of which occur in the UAE (Hogarth and Beech, in press). Male fiddlers have one claw very much larger than the other – in some species it may be longer than the animal's entire body and weigh a third or more of the total body mass. The minor claw of males, and both claws of females, are very different in shape and are used for feeding. *Uca* feeds by scooping up sand or mud, using its mouthparts to separate organic particles from sand grains, dumping the latter and passing the digestible organic matter into its gut. As males have only one feeding claw, compared with the two of females, feeding is much harder work for them (Weissburg 1993).

The male's enlarged claw is waved around in a distinctive pattern characteristic of each species, as a signal to attract females and deter rival males. If the threat fails to deter, then the claw becomes a weapon in the ensuing joust. In some species of *Uca* the major claw is consistently on one side, usually the right, but in most species, such as *U. inversa*, the population splits into roughly equal numbers of right-handed and left-handed individuals.

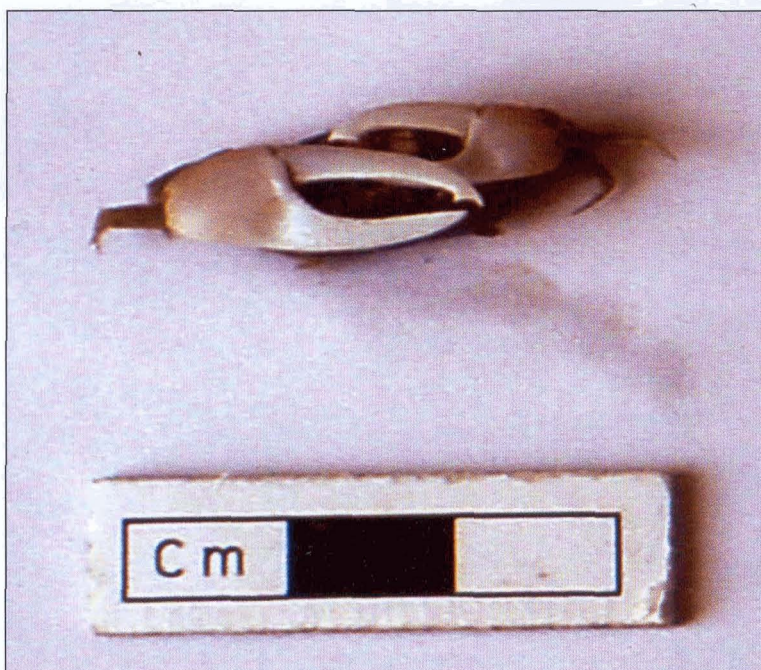
On a recent visit to the mangroves of Kalba, we came across a male *Uca inversa*, one of the common fiddler species of the UAE, which bore two major claws, one slightly smaller than the other, but both clearly shaped for display rather than feeding purposes (see Figure). Males with two major claws have been noted in one or two species of *Uca*, but are extremely rare (Takeda and

Yamaguchi 1973, Yamaguchi 1977, and personal communications from several colleagues).

How did this come about? It raises questions about what determines fiddler crab handedness in the first place. There have been several theories, none convincingly established. Fiddler crabs start out symmetrical, with handedness appearing progressively in males while they are still small. In exclusively right-handed species this must be determined genetically, but in other species, such as *U. inversa*, it may be random. Once an individual crab becomes left- or right-handed, it never subsequently changes. It has been shown experimentally in several species of *Uca* that if a major claw is lost, the replacement is always another major claw, never a minor one, so handedness remains the same (Vernberg and Costlow 1966, Ahmed 1978).

Losing claws and legs is an occupational hazard of being a crab. In fact, crab legs have a weak point and a special muscle so that they can autotomise, or spontaneously snap off their own leg. This is important for survival. If, for example, a crab is trapped by a stone rolling onto its leg, or if the leg is seized by a predator, the crab can escape. Occasionally a crab can be found hobbling around on two legs and a claw, the remaining seven limbs having been shed.

Crabs are good at regenerating lost limbs. Regeneration takes time, and progress is only made when the crab moults its carapace. Usually the first sign of regeneration is a tiny bud at the point where the leg was lost. After a moult this may appear as a tiny limb folded up within the regeneration bud. After the next moult, this becomes a



Male *Uca inversa* from Khor Kalba – the animal almost ~~carried~~ its two major claws



free limb, complete in all its parts, but much smaller than the one it replaces. It catches up in size over successive moults.

The Kalba specimen has one claw smaller than the other, suggesting that the mistake was made during regeneration of a lost minor claw, and that the regenerating left claw would eventually have increased to full size as a mirror image of the major right hand one. Apart from this, there is no clue about what went wrong. If this is a result of a mistake during regeneration, the size of the smaller major claw indicates that it happened several moults earlier, and that the male has survived successfully for some time. How did it feed during this time, with no minor claw? There have been observations of fiddlers using major claws to shovel mud towards the mouth, and of some that had lost both claws ploughing into the sediment with their mouthparts alone. Feeding may be inefficient, but is still possible, without the requisite limbs.

Finally, it would be interesting to know the impact of having two major claws on this individual's social life. Was it twice as effective at attracting a mate, or were any social advantages outweighed by the cost of carrying two such extravagant structures around and being handicapped in feeding?

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# ***Bubopsis hamata* (Klug) (Neuroptera: Ascalaphidae) – a new owlfly for the UAE**

by **Brigitte Howarth & Simon Aspinall**

On 26 March 2001 a single individual of an unknown owlfly (Ascalaphidae) was photographed by SA at a prehistoric tomb at Dhayah, Ra's al Khaimah. It was subsequently identified by BH as *Bubopsis hamata*, a species apparently previously unrecorded in the UAE. Determining characters confirming the identification were the pale hairs on the head and thorax, the abdomen with large yellow spots, the antennae being yellow at the base, and club being yellow basally and brown apically (as seen clearly in one photograph). The tibia was also yellow. This essentially Eremian species is known to occur in Sudan, Ethiopia, Senegal, Cape Verde Islands, Palestine and Saudi Arabia (Holzel, 1983), thus its eventual discovery in UAE was not entirely unexpected. The individual observed at Dhayah was resting on a bare, dead stalk of a plant growing out from between the rocks forming the tomb walls at under 50 m a.s.l. on the mountain foreland. This behaviour appears to be characteristic of *B. hamata*. It is known to sit in wait for its prey of other flying insects (Walker & Pittaway 1987).

Ascalaphidae, members of the order Neuroptera, can be further sub-divided into the suborders Megaloptera (with more primitive wing venation) and the Planipennia (which includes most of the Neuroptera) (Davies, 1988). Ascalaphidae are closely related to Myrmeleontidae, the antlions. Antlion larvae commonly make conical pitfall traps in the soil with which they capture their prey. Although owlfly larvae have the same characteristic mouthparts, comprising long mandibles and maxillae which form the jaw, they do not build pitfall traps but actively hunt prey hidden under stones or vegetation (Davies, 1988). The adult can be distinguished from antlions by the long, clubbed antennae.

Two other species of owlfly have been recorded previously in the UAE, only one of which, *Ascalaphus festivus* (Rambur), has been identified (Gillett, 1999). The other, despite remaining unidentified and apparently not of the genus *Ascalaphus*, is, however, clearly not *B. hamata*, nor a fourth species, *Tmesibasis larseni* (Holzel) which is also known from the Arabian peninsula.

Identifying specimens from photographs is not generally recommended and was only possible in this case because the owlfly was shot from two sides, once in profile and backlit (photograph 1) and the other with light falling directly onto the insect (photograph 2). Both photographs show important identification features, not all of which are visible in either frame singly.

*B. hamata* is known to breed in desert steppes (Walker & Pittaway 1987), although adult (imago) owlflies do not appear to be rigidly habitat specific. The terrain at Dhayah was rocky, with *Acacia tortilis* and *Tephrosia apollinea* dominant.

Details of any further observations of this or any other species of owlfly recorded in the UAE would be welcomed by the authors.

## **Acknowledgement**

Dr. Herbert Holzel is thanked for providing published material and confirming the identity of the photographed specimen.

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## **Postscript**

Also in the spring of 2001, Gary Feulner and Peter Cunningham found and photographed an owlfly at 1300m, about 2km NNE of Jebel Yibir (the peak with the radar dome overlooking Ra's al-Khaimah airport). It is believed, from the illustration in Walker & Pittaway (1987), also to be *B.hamata*, although this identification remains to be confirmed.



# A list of rare birds in the UAE requiring descriptions

by *Emirates Bird Records Committee*

The EBRC has recently finalised a list of species requiring formal descriptions for them to be accepted.. Observers believing that they have seen any of the following list should send a full description, with photographs if taken, to: **EBRC, c/o P.O. Box 50394, Dubai, UAE.**

A standard form is preferred for submissions, and is available via email from Colin Richardson: **colinr@emirates.net.ae** or Simon Aspinall: **hudhudlo@emirates.net.ae**

Records of other species seen are also welcomed, and will be incorporated into the EBRC's national database. The total UAE list has now been divided into four categories. Category A, for species that have been recorded in an apparently wild state in the UAE, had a total of 405 species at the end of 2002, with several distinct sub-species being included under the nominate species for the purposes of the UAE List, although these may have been 'split' as separate species by other authorities (e.g. Masked Wagtail *Motacilla alba personata* under White Wagtail *M. alba*, and Desert Lesser Whitethroat *Sylvia curruca minula* and Hume's Lesser

Whitethroat *Sylvia curruca althaea* under Lesser Whitethroat *Sylvia curruca*.

Category B includes species considered probably to have occurred in the UAE in a wild state, but for which the possibility of escape or release from captivity cannot satisfactorily be excluded. Category C concerns species originally introduced to the UAE by Man that maintain a regular feral breeding stock. Category D is species for which all published UAE records are considered likely to birds that have escaped or have been released from captivity and whose populations are not considered to be self-sustaining. This category includes several species that are known to have bred and may be upgraded to Category C in future.

The list is 'dynamic,' in the sense that not only are new species added fairly regularly to Category A, following evaluation of records by the EBRC, but old records are also reassessed from time to time, this leading on occasion to a deletion of species from the list. Upgrades from Category B to Category A and from Category D to Category C may also occur.

Great Crested Grebe	White-breasted Waterhen	White-throated Bee-eater	Pied Flycatcher
Sooty Shearwater	Crested Coot	Dunn's Lark	Bay-backed Shrike
Leach's Storm-Petrel	Common Crane	Calandra Lark	Long-tailed Shrike
Red-footed Booby	Demoiselle Crane	Temminck's Horned Lark	Black Drongo
Masked Booby	Little Bustard	Wire-tailed Swallow	Amethyst Starling
Brown Booby	Oriental Pratincole	Brown-throated Sand Martin	Wattled Starling
White Pelican	Black-winged Pratincole	Asian House Martin	Dead Sea Sparrow
Dalmatian Pelican	Little Pratincole	Indian Cliff Swallow	Tree Sparrow
Intermediate Egret	Kittlitz's Plover	Buff-bellied Pipit	Chaffinch
Black Stork	Knot	Black Bush Robin	Goldfinch
Lesser Flamingo	Red-necked Stint	Blackstart	Linnet
Mute Swan	Pectoral Sandpiper	Eversmann's Redstart	Pine Bunting
Bewick's Swan	Great Snipe	(fem/imms.)	Yellowhammer
Whooper Swan	Woodcock	Pied Stonechat	White-capped Bunting
White-fronted Goose	Grey Phalarope	Finsch's Wheatear (fem/imm	Rustic Bunting
Lesser White-fronted Goose	Long-tailed Skua	males)	Little Bunting
Cotton Teal	Catharacta spp.	White-crowned Black	Yellow-breasted Bunting
Marbled Teal	Little Gull	Wheatear	Reed Bunting
Red-crested Pochard	Kittiwake	Ring Ouzel	Red-headed Bunting
Red-breasted Merganser	White-eyed Gull	Blackbird	
Crested Honey Buzzard	Mediterranean Gull	Eye-browed Thrush	
(excl. Abu Dhabi island)	Sabine's Gull	Fieldfare	
Black-shouldered Kite	Brown-headed Gull	Redwing	
Brahminy Kite	Common Gull	Mistle Thrush	
Pallas's Fish Eagle	Roseate Tern	Cetti's Warbler	
Griffon Vulture	Arctic Tern	River Warbler	
Lappet-faced Vulture	Sooty Tern	Moustached Warbler	
Goshawk	Black Tern	Paddyfield Warbler	
Shikra (excl. Dubai suburbs)	Lesser Noddy	Blyth's Reed Warbler	
Levant Sparrowhawk	Common Noddy	Booted Warbler	
Lesser Spotted Eagle	Spotted Sandgrouse	( <i>H. c. caligata</i> )	
White-eyed Buzzard	Black-bellied Sandgrouse	Icterine Warbler	
Golden Eagle	Woodpigeon	Green Warbler	
Amur Falcon	Oriental Turtle Dove	Yellow-browed Warbler	
Merlin	Indian Koel	Hume's Warbler	
Lanner Falcon	Long-eared Owl	Radde's Warbler	
Saker Falcon	Pacific Fork-tailed Swift	Dusky Warbler	
Little Crane	White-breasted Kingfisher	Eastern Bonelli's Warbler	
Baillon's Crane	Grey-headed Kingfisher	Blue-and-white Flycatcher	

# News Round-Up

## Sheikh Mubarak and Bish Brown Awards - 2002 winners

The Emirates Natural History Group (Abu Dhabi) has announced the winners for 2002 of its two awards, the Sheikh Mubarak bin Mohammed Al Nahyan Award for Natural History and the Bish Brown Natural History Prize. Winner of the Sheikh Mubarak Award was Phil Iddison, a former resident of Al Ain (and *Tribulus* contributor), who was selected on the basis of his scientific contributions to the study of food in the UAE.

Winner of the Bish Brown Prize was Brien Holmes, (also a former *Tribulus* contributor), for his contributions to the promotion of environmental awareness and study of the UAE's natural history through his activities as Chairman of the ENHG (Al Ain).

## ENHG Conservation Fund grant

The Emirates Natural History Group made a grant from its Conservation Fund in late 2002 to the Abu Dhabi Islands Archaeological Survey, ADIAS, to support its second season of investigations at a Late Stone Age and early Bronze Age site at Abu Dhabi International Airport. ENHG members also acted as volunteers during the excavations at the site.

A report on results of the work will appear in a future issue of *Tribulus*.

Applications for grants from the Group's Conservation Fund may be made to the Group Chairman. Preference is given to projects in the UAE or which are directly related to issues of concern to conservation of wildlife, the environment and heritage in the Emirates.

## Wildlife trade suspension lifted

Following on from the report in, *Tribulus* 12.1, "UAE cracks down on illegal wildlife trade," the trade suspension brought into effect under the terms of the Convention on International Trade in Endangered Species of Wild Fauna & Flora, CITES, to which the UAE is party, has now been lifted. This was made possible by the prompt action of government in introducing a suite of measures to bolster the regulation of traded and trans-shipped CITES listed species, including caviar, which is widely accepted as having precipitated the initial suspension. Amongst measures introduced are new domestic legislation, and so-called "falcon passports" which all birds must possess before being permitted to travel out of the country on hunting trips.

The 'passports' are issued by the Environmental research and Wildlife Development Agency, ERWDA, which is also the designated UAE scientific authority for CITES matters. (Source: CITES, ERWDA)

## Leopard breeding success

Sharjah's Breeding Centre for Endangered Arabian Wildlife announced the birth of a new Arabian leopard cub in June 2002, bringing the total at the Centre to 12. The latest arrival was born to a female, Hesra, on loan

from Oman, and was sired by a male, Al Jazira, on loan from Saudi Arabia. The male parent is to be returned to Saudi Arabia, while Arnold, a male rescued by the Arabian Leopard Trust from Yemen several years ago, is to be sent to Oman in breeding loan.

The Centre now has a total of 12 leopards, out of a total of 33 in captivity, while another female is pregnant by Al Jazira.

The Centre, part of Sharjah's Environment and Protected Areas Authority, has collaboration agreements with Oman, Yemen and Saudi Arabia, and has now established itself as the most successful breeding centre for Arabian leopards in the world.

(Source: Gulf Today 25 June 2002)

## Rare lizard bred at Sharjah

A pair of Yemen Monitors *Varanus yemenensis* given by the Yemen government's Environment Protection Agency to the Sharjah Breeding Centre for Endangered Arabian Wildlife bred successfully late in 2002, with the female laying eight eggs. This endangered species was formally described as recently as only 1989, having been first recognised as a new species by German herpetologists watching a TV programme on the nature of North Yemen!

The Yemen Monitor is known to inhabit only four small areas in Yemen and three in Saudi Arabia. Although diurnal, relatively little is known of its behaviour or private life. It is the largest lizard in the Arabian peninsula, and can attain a length of 1.5m.

(Source: WAM News Agency; Gardner in litt.)

[Further reading: Bohme, W., Joger, U., and Schatti, B. 1989. A new monitor lizard (Reptilia: Varanidae) from Yemen, with notes on ecology, phylogeny and zoogeography. *Fauna of Saudi Arabia* 10: 433-448.]

## Aden Gerbil added to Sharjah collection

A gift of thirteen Aden Gerbils *Gerbillus pocilops* has also recently been received by the Sharjah Breeding Centre. These came from the National Wildlife Research Centre in Saudi Arabia as part of a programme of breeding loans and exchanges, and brings the number of species of rodent held in Sharjah up to 17 out of the 23 known from the Arabian peninsula.

(Source: Gulf News 25/12/02)

## Federal laws and legislation on CD-Rom and internet

The UAE Jurists' Association has produced a CD-Rom containing federal laws and legislation pertaining to each emirate. Included is a detailed encyclopaedia of the country's laws, and court rulings issued by the Federal Supreme Court and Dubai's Court of Cassation. The same information is reportedly to be made available free of charge to the public via the internet.

(Source: Al Tamimi & Company; Law Update Issue No. 140, Nov. 2002)

## Mangrove Tree Snails reach Khor Dubai

Gary Feulner reports in **Gazelle** (17:11) that the mangrove tree snail *Littoraria intermedia* has now reached the mangroves planted up to ten years ago in Khor Dubai.

(Source: DNHG).

## Starfish damaging Khor Fakkan coral

Divers in Khor Fakkan, Sharjah, are urging the Ministry of Agriculture & Fisheries to clear the seabed of invasive starfish, which are apparently destroying coral reefs locally, especially around the popular diving spot of Shark Island. Tourism and water-sports provide an important source of revenue here and have reportedly already been adversely affected. According to local reports, the large, unnamed starfish responsible was previously unknown in the immediate area.

(Source: Gulf News 1/1/03).

[The starfish responsible is presumably the Crown of Thorns *Acanthaster planci*, which is common in Musandam, but hitherto had reportedly been relatively uncommon in UAE East Coast waters].

## ERWDA fish population dynamics project

In line with the strategic goal of developing a management regime for the fisheries of Abu Dhabi, ERWDA's Marine Environmental Research Centre has been undertaking a Fish Population Dynamics Project. The principal objective is to establish and monitor the

status of the key fisheries resources of Abu Dhabi, namely: *Acanthopagrus bifasciatus*, *Argyrops spinifer*, *Carangoides bajad*, *Diagramma pictum*, *Epinephelus coioides*, *Gnathodon speciosus*, *Plectorhinchus pictus* and *Lethrinus nebulosus*.

Size frequency and biological data was collected from catches landed in Abu Dhabi between September 2000 and October 2002. Cross-sections of sagittal otoliths show banding which enables estimates of fish ages to be made. Size at age data was subsequently used in the estimation of rates of growth, natural and fishing mortality. Key life history characteristics including the age and size at first sexual maturity were used as biological reference points for investigating resource status. The current rate of exploitation was evaluated using relative yield per recruit, analysed to estimate the optimum and maximum sustainable levels of fishing mortality for each of the study species.

Gonadosomatic and maturity stage indices revealed that there was no reproductive activity over the summer months and spawning probably took place prior to the commencement of the biological sampling programme in May. Juvenile retention rates exceeded 50% for all species and for *Argyrops spinifer*, 92.6% of the aggregated catch sample was composed of fish that had not reached sexual maturity.

The key species examined were all being exploited at sizes substantially below that which would optimise the yield from the available resource, highlighting the potential of over-fishing. A comparison of the existing fishery induced mortality with that corresponding to optimum levels suggests that the current rate of exploitation is in excess of both the optimum and maximum sustainable levels for the majority of species in this study. A review of the existing trap mesh size regulations is to be recommended.

(Source: E. Grandcourt, MERC, ERWDA).

# Reviews, Publications and Research

## Published Papers

The following papers or short notes on UAE or UAE-related topics have been published recently and have been brought to the attention of the editors. Authors are invited to submit details on a regular basis to this bi-annual bibliography.

## Natural History

Brown, G. 2002. Species richness, diversity and biomass production of desert annuals in an ungrazed *Rhanterium epapposum* community over three growth seasons in Kuwait. **Plant Ecology** 165: 53-68, 2002.

Brown, G., Schultz, M. & Robinson, M.D. 2002. Saxicolous and terricolous lichens from the foothills of northern Oman. **Nova Hedwigia** 75: 1-2, 177-188.

Schultz, M., Brown, G. & Budel, B. 2000. Cyanophilous lichens from Kuwait. **Nova Hedwigia** 70: 1-2, 193-216.

Gary Brown is employed by ERWDA and currently preparing a note for *Tribulus* on lichens in the UAE.

Cunningham, P. (2002) Tadpoles included in the diet of *Coluber rhodorachis* (JAN 1865). **Herpetozoa**, 4 (34), 173.

Cunningham, P. (2002). Status of the Sand Cat, *Felis margarita*, in the United Arab Emirates. **Zoology in the Middle East** 25.

pp. 9-14. ISSN 0939-7140. Kasperek Verlag, Heidelberg. Cunningham, P. (2002). Confirmed breeding of the Lichtenstein's Sandgrouse, *Pterocles lichtensteinii*, from the United Arab Emirates. **Zoology in the Middle East** 25. pp. 15-18. ISSN 0939-7140. Kasperek Verlag, Heidelberg.

Cunningham, P.L. and B. Howarth, B. (2002). Notes on the distribution and diet of Blanford's Fox *Vulpes cana* Blanford from the United Arab Emirates. **Zoology in the Middle East**, 27:1877 Conservation assessment and management plan (CAMP) for the threatened fauna of Arabia's mountain habitat. Briefing books: *Mammals and Freshwater Fish* (2002) Breeding Centre for Endangered Arabian Wildlife, Sharjah, in collaboration with IUCN/SSC Conservation Breeding Specialist Group. Sharjah.

*Conservation assessment and management plan (CAMP) for the threatened fauna of Arabia's mountain habitat. Final report* (2002) Breeding Centre for Endangered Arabian Wildlife, Sharjah, in collaboration with IUCN/SSC CBSG, Apple Valley. Min. USA.

## Geology and Climate Change

### GeoArabia

Evans, G., Kirkham, A. & Carter, R.A. (2002). Quaternary Development of the United Arab Emirates Coast: New Evidence from Marawah Island, Abu Dhabi. **GeoArabia** 7(3): 441-458.

## Global & Planetary Change

Vol. 35 (2002) contained a useful paper by the US Geological Survey and the Department of Antiquities and Tourism in Al Ain, as follows:

Jorgensen, D.G. & W.Y. al-Tikriti (2002). A hydrologic and archaeological study of climate change in Al Ain, United Arab Emirates. Vol. 35: 37-49.

## Archaeology

The 2001 volume of the **Proceedings of the Seminar for Arabian Studies, Vol. 31**, contained the following UAE-related papers, all originally delivered at the July 2000 Seminar.

Elders, J. *The lost churches of the Arabian Gulf: recent discoveries on the islands of Sir Bani Yas and Marawah, Abu Dhabi Emirate, United Arab Emirates.* pp. 47-58.

Magee, P., with Emma Thompson. *Excavations at Muwailah 1997-2000.* pp. 115-130.

Mery, S., Rouquet, J. McSweeney, K., Basset, G., Saliege, J.-F. & Al Takriti, W.Y. *Re-excavation of the Early Bronze Age collective Hili N pit-grave (Emirate of Abu Dhabi, UAE): results of the first two campaigns of the Emirati-French Project.* pp. 179-188.

Uerpman, M. *Remarks on the animal economy of Tell Abraq (Emirates of Sharjah and Umm al-Qaywayn, UAE).* pp. 227-234.

Papers in the 2002 **Proceedings (Vol. 32)**, included the following UAE-related papers, originally delivered at the July 2001 Seminar.

M. Pozo Rodriguez, M. & J.M. Cordoba Zoilo, *Architecture, implements and geological constraints. Provenance-study and archaeology on the uses and technologies of an Iron Age village (AM. I-Thuqeibah, Emirate of Sharjah, UAE)*

Tengberg, T. *The importation of wood to the Arabian Gulf region. The evidence from charcoal.*

Al-Tikriti, W. Y. *The south-east Arabian origin of the falaj system.*

Kennet, D. *The development of northern Ra's al-Khaimah and the 14th-century Hormuzi economic boom in the lower Gulf.*

David, H. *Chlorite vessels from Umm an-Nar tombs at Hili: a comparison.*

## Arabian Archaeology & Epigraphy

Among papers in **Vol. 13 (2002)** related to the UAE were:

Magee, P., E. Thompson, A. Mackay, P. Kottaras and L. Weeks *Further Evidence of Desert Settlement Complexity: Report on the 2001 Excavations at the Iron Age Site of Muweilah, Emirate of Sharjah, United Arab Emirates.* pp. 132-156.

Haerinck, E. *Textile Remains from Eastern Arabia and new Finds from Shakoura (Bahrain) and ed-Dur (Umm al-Qaiwain, U.A.E).* pp.253-254, 9 figs.

## Minerva (London) (ISSN: 0026-4695) – Vol. 13 (2002)

Haerinck, E. *Indigenous coinage of pre-Islamic South-East Arabia, Minerva Vol. 13, no. 2, March/April 2002, pp. 54-56, 9 fig.*

Haerinck, E. *Boom and bust at ed-Dur, Minerva, Vol. 13, (4), July/August 2002, pp. 41-44, 13 fig.*

## Conference Papers

The International Date Palm Forum: Date Palm Culture in the United Arab Emirates, Abu Dhabi, 15th – 17th September 2002. organised by Emirates Centre for Strategic Studies and Research. Papers on archaeological topics were:

Dr. M. Beech (ADIAS): Archaeobotanical evidence for Early Date Consumption in the Arabian Gulf.

Professor D.T. Potts (Sydney): Date Palms and Date Consumption in the Gulf Region during the Bronze Age.

Dr. M. Tengberg (Sorbonne): The Origins of Date Palm Domestication: the state of research on the origins of Phoenix dactylifera.

## Books Received

Inclusion in this listing does not preclude future review

**The Island of Abu Al Abyad**, (ed. R.J. Perry), published by Environmental Research and Wildlife Development Agency, ERWDA, PO Box 45553, Abu Dhabi, UAE. ISBN 9948-408-19-5. 2002.

An illustrated overview of the geology, archaeology and natural history of the UAE's largest island. Chapters on Geology (Yousef Elsamani & Azhari Abdulgadir), Archaeology (Peter Hellyer & Daniel Hull), Marine Environment and Mariculture (Thabet Abdessalaam & Omer Mohammed Yousif), Mammals (Christopher Drew & Amrita G. de Soyza), Birds (Simon Aspinall), Vegetation (Fawzi M. Karim).

**Qasr Al Hosn – the History of the Rulers of Abu Dhabi, 1793-1966.** by Dr. Jayanti Maitra & Afra Al-Hajji. Centre for Documentation and Research, PO Box 2380, Abu Dhabi, UAE. ISBN: 1-86063-105-3. Published 2001. 263 pp.

A review both of the history of the Qasr Al Hosn (Abu Dhabi's 'Old Fort,' and of the Sheikhs of Abu Dhabi who ruled from it.

**Feast of Dates**, by Dan Potts. Trident Press, UK. 2002. ISBN 1-900724-59-6.

A masterful introduction to the importance of the date palm and its fruit, with particular reference to the UAE, covering the history of its utilisation from antiquity to the present and current developments in date-palm cultivation. Published to coincide with the September 2002 conference in Abu Dhabi, (see above).

**New Observations on Camels and their Milk**, by Dr. U. Wernery. Central Veterinary Research Laboratory, PO Box 597, Dubai, UAE. 2002. e-mail: [microbio@emirates.net.ae](mailto:microbio@emirates.net.ae). 50 pp.

A summary of recent studies on camel milk, by the Director of *Dubai's CVRL*.



# تريبيلوس

مجلة جمعية الامارات للتاريخ الطبيعي

خريف / شتاء ٢٠٠٢ م

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