

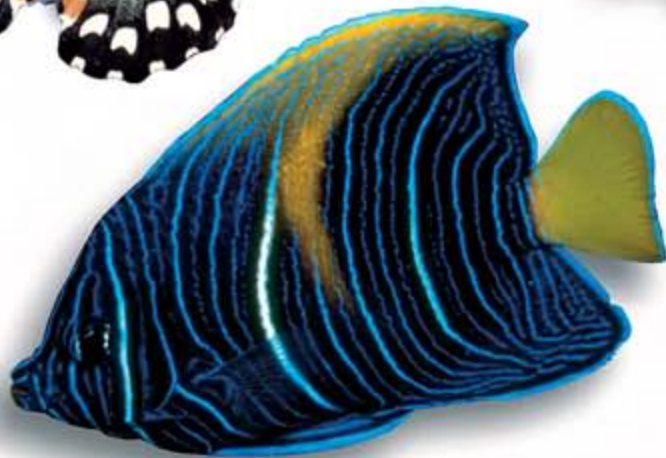


الهيئة العامة للبيئة
Environment Agency - ABU DHABI

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THE EMIRATES A NATURAL HISTORY



- MAMMALS • BIRDS • MARINE LIFE
- REPTILES • AMPHIBIANS • INSECTS
- GEOLOGY • FOSSILS • HABITATS
- LIFE ON THE SEASHORE
- PLANTS • CONSERVATION

WILDLIFE OF THE UNITED ARAB EMIRATES

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HH Sheikh Hamdan bin Zayed Al Nahyan, Mohammed Al Bowardi,
Peter Hellyer, Simon Aspinall, Gary Feulner, Graham Evans, Anthony Kirkham,
Peter Whybrow, Andrew Smith, Andrew Hill, Gary Brown, Benno Böer,
Mark Beech, Olivia Pozzan, David John, David George, Geraldine Reid,
David Williams, Michael Gillett, Conrad Gillett, Brigitte Howarth,
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The Agency's mission is to assist the Abu Dhabi Government in the conservation and management of the Emirate's natural environment, resources, wildlife and biological diversity through scientific research, proactive planning and co-ordination, environmental awareness promotion, policy formulation and enforcement that balances sustainable economic development with protection of the environment for this and future generations.

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An unparalleled group of experts from all over the world, as well as UAE-based scholars, has been responsible for the research, study and editorial preparation that have gone into this work. It presents both a review of current knowledge – and a guide to what needs to be done in reviving and conserving the fragile ecosystem of the nation.

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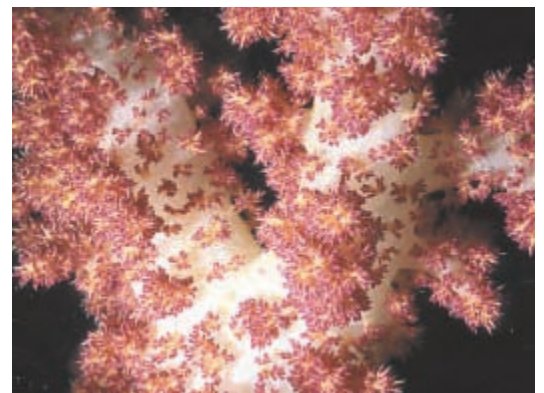
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FOREWORD



THE UNITED ARAB EMIRATES IS A RELATIVELY SMALL COUNTRY and, to the outsider at least, appears to be little more than a collection of barren deserts and mountains, bordered by shallow seas. Yet its territory, both terrestrial and marine, is of enormous scientific interest.

Its geology, best known for extensive reserves of sub-surface hydrocarbons, has much to tell us about the way in which the Arabian Peninsula was formed and contains fossils from several periods, in some cases representing the best exposures of such fossils to be found anywhere in the world.

Its terrestrial flora and fauna display remarkable adaptations that permit them to survive amid the harsh and forbidding landscape, while offshore, both in the Arabian Gulf and in the Gulf of Oman, there is a variety of marine life that has much to offer the dedicated researcher.

Lying at the junction of three biogeographical zones, the biodiversity of the UAE is not only considerable but is also of international importance, although it lacks the abundance of species to be found in regions where climate is less harsh.

The first recorded scientific observations of the geology, flora and fauna of the UAE go back over a century and a half. Over the course of the nearly three and a half decades since the UAE was established, the pace of scientific research has grown dramatically – in line with the country's progress in other fields. Many species new to science have been found, and knowledge has been gained that is of global significance.

This book provides an overview of the knowledge that has so far been amassed on the country's geology, palaeontology, natural history and environment. It represents, at the same time, a celebration of the dedication shown by the professional scientists and others, who have devoted so much effort to its collection and interpretation. It will, I hope, provide an absorbing and illuminating insight into the country.

Through bodies such as the Environment Agency – Abu Dhabi (EAD), formerly the Environmental Research and Wildlife Development Agency (ERWDA), the Government of the UAE is demonstrating its commitment to the study and conservation of the country's environment and its biodiversity.

The UAE's former President, His Highness Sheikh Zayed bin Sultan Al Nahyan, was quoted as stating that: 'A people that knows not its past has neither present nor future.' If we are to fully understand our past, we must understand the nature of the land and seas in which our ancestors lived, and if we are to fulfil properly our responsibility to provide for future generations, we must hand on to them the environment, flora and fauna of which we are today merely the custodians.

This book will, I believe, make an important contribution to that process and will, at the same time, help to introduce to others something about the country of which we are so proud.

Hamdan bin Zayed Al Nahyan



*The burrowing ghost crab *Ocypode* sp., including (top left) a typical burrow entrance and accompanying tower.*



CRABS

CRABS ARE AMONG THE MOST DIVERSE, abundant, and ecologically important groups of marine invertebrates. Little is known about UAE crabs, despite several recent surveys, for example of the mangrove species of the Abu Dhabi islands (Cooper 1997) and of Umm al-Qaiwain (Al-Ghais and Cooper 1996) and, more generally, of intertidal habitats on the mainland coastline (Hornby 1997). The most comprehensive (unpublished) study was restricted to Dubai (Titgen 1982).

Many crabs are small, camouflaged, or spend much of their time in burrows or under rocks. Other, larger and more conspicuous species occur only in deeper water.

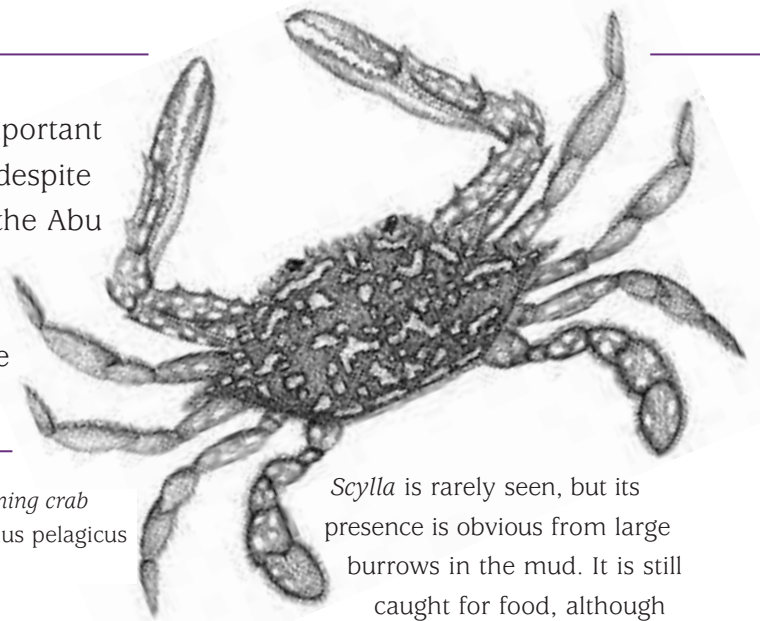
The UAE crab fauna is dominated in terms of species richness, abundance, and biomass by members of four families: the Portunidae or swimming crabs, the Grapsidae and Ocypodidae, many members of which are found in mangroves and other intertidal habitats, and the Xanthoidea, a diverse and widespread superfamily. In general, species diversity increases towards the mouth of the Arabian Gulf, and is greatest on the East Coast of the UAE (Apel and Türkay 1998).

Swimming Crabs (Portunidae)

Portunids are characterised by the paddle-like hindmost pair of legs, an adaptation to swimming.

Although some species are truly pelagic and are found far from shore, most portunids swim in short bursts to pounce on prey or to escape predators. The commonest local species is *Portunus pelagicus*. When disturbed, this crab shoots abruptly away for several metres before again freezing into immobility and disappearing from sight.

The largest swimming crab in the world, the mangrove crab *Scylla serrata*, occurs in Khor Ra's al-Khaimah and Khor Kalba (Hogarth and Beech 2001; Feulner 2002): it may reach 20 centimetres in carapace breadth, and a weight of 2 kilograms. Despite its size,



Swimming crab
Portunus pelagicus

Scylla is rarely seen, but its presence is obvious from large burrows in the mud. It is still caught for food, although

protected, and has been eaten in the UAE for thousands of years; remains have been identified from archaeological sites at, for example, Kush, Rifaq and Kalba (Beech *et al.*, in press).

Generally scavengers or predators, swimming crabs take fish or other invertebrates such as molluscs. *Scylla* can crush almost anything with its massive claws. Highly mobile, swimming crabs may be important in the flow of energy and material between habitats. Crabs may feed on

small invertebrates in a mangrove forest, then migrate into a seagrass bed and be eaten by fish. The productivity of one habitat contributes to neighbouring habitats, and swimming crabs are probably one of the major channels whereby this comes about. Swimming crabs are also commercially significant (Guinot 1966), *Portunus pelagicus* and

Charybdis natator commonly appearing in souqs in the UAE.

The holotype of the species *Thalamita rubridens* was collected in 1995 from rocky areas east of Marawah, in western Abu Dhabi, with paratypes from Ra's Ghantut and Bazm al-Gharbi (Apel and Spiridonov 1998).

Another species, *Portunus arabicus*, was first described (as *Neptunus [Hellenus] arabicus*) from material collected in 1901, off the island of Arzanah, in western Abu Dhabi, and Djibouti (Nobili 1906).

Grapsid Crabs (Grapsidae)

Grapsus albolineatus, largest of the UAE's grapsid crabs, lives on small algae, which it scrapes off rocks in breaking waves. *Grapsus* survives by clinging close to the rock surface with its spiky legs and having a smooth, disc-like body which offers little resistance to the waves. Potential predators (such as fish and birds) are unable to operate easily in these conditions.

Perhaps the most ecologically important grapsids are found in mangroves. *Metopograpsus messor* is probably a generalist (although little is known of the habits of this widespread and common species). Virtually restricted to mangroves are two rather similar



Mangrove crab
Scylla serrata

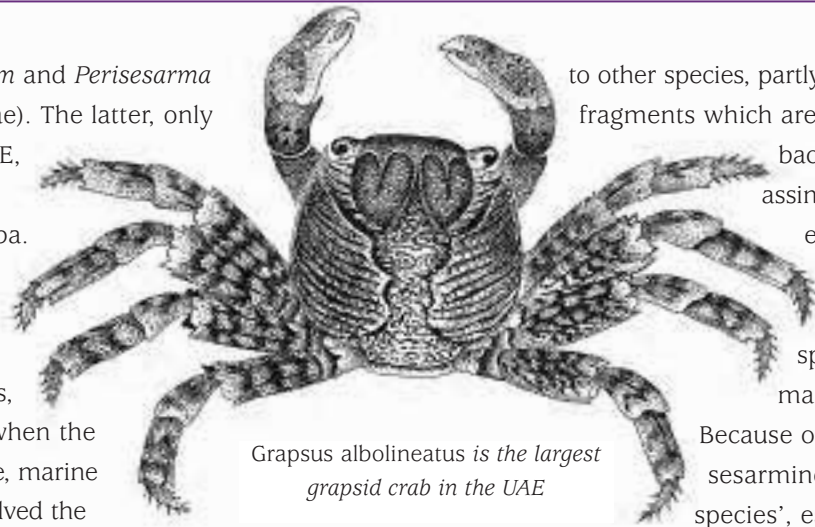


Swimming crab
Charybdis sp.

species, *Parasesarma plicatum* and *Perisesarma guttatum* (subfamily Sesarminae). The latter, only recently recorded from the UAE, is common in mangroves at Ra's al-Khaimah and Khor Kalba.

These two species – both nondescript in carapace pattern, but with conspicuous orange claws – are amphibious, foraging actively on the mud when the tide is out, and being, therefore, marine animals which have partially solved the problems of life on land. Crab gills are efficient at extracting oxygen from water, but are much less effective in air. Sesarmine crabs extrude water from their gill chambers through the mouth, and allow it to trickle over both upper and lower surfaces of their carapace. These surfaces, particularly the lower surface, are furnished with a pattern of short bristles which spread the water out into a smooth-flowing film, forming a broad moist surface for oxygen uptake. The reoxygenated water is then taken back into the gill chambers where oxygen is transferred to the blood. This recycling process forms, in effect, an external lung, conserves water, and probably also helps to cool the crab by evaporation – a neat combination of physiological trickery (Hogarth 1999: 100–102).

Sesarmine crabs are voracious eaters of mangrove leaves. Low in nutritional value, probably rich in aversive chemicals, this food is directly eaten by virtually no other species. The sesarmine crabs are, therefore, important in making mangrove productivity available



Grapsus albolineatus is the largest grapsid crab in the UAE

to other species, partly through shredding leaves into fragments which are more rapidly broken down by bacterial decomposition, partly by assimilating the leaf material and being eaten in turn by other species.

Extensive burrowing by sesarmines (and other crab species) also aerates the soil of mangroves, enhancing tree growth. Because of their ecological importance, sesarmine crabs have been termed 'keystone species', essential to the general function of mangrove ecosystems (Hogarth 1999: 83–92; Hogarth 2001).

Ocypodid Crabs (Ocypodidae)

Largest of the UAE's ocypodid crabs, the ghost crab *Ocypode rotundata*, is seldom seen. It lives in burrows in the upper regions of sandy shores, often marked by towers of sand which may have a display function. Emerging to forage, often at dusk, its tracks can sometimes be followed for hundreds of metres inland. Rarely has a crab been better named: the scientific name of the genus means 'swift-footed', and the common name from its nocturnal habits and ivory colour and, perhaps, from its ability to disappear suddenly.

Smaller ocypodids are deposit feeders, extracting particles from surface layers of sand or mud, a complex process, involving taking sediment in to the mouth parts, separating organic particles from mineral by flotation, and detaching very small organic particles from sand grains with specially formed microscopic



CRABS



Fiddler crab *Uca* sp.

bristles. The residue is deposited as pellets of sand. One species, the tiny *Scopimera crabricauda*, is extremely numerous and can process almost the entire surface of a sandy beach between one high tide and the next.

The most striking ocypodid crabs are the fiddler crabs (*Uca*). Several species occur in the UAE. Female fiddler crabs are relatively inconspicuous, spending much of their time peacefully processing sand. Males, in contrast, are positively flamboyant. One claw is used in feeding, and is very similar to the claws of females. The other is greatly enlarged and often brightly coloured. This is waved vigorously to attract females or deter other males. If the deterrent does not work, the claw becomes a weapon in the subsequent joust.

Xanthoid Crabs (Xanthoidea)

The superfamily Xanthoidea comprises several closely-related families. The Trapeziidae live exclusively in branching corals. Small, but often brightly coloured, they have needle-sharp claws, which may be as large as the rest of the crab's body. These are used in combat against other members of the species – trapeziids are aggressively territorial – and in defending their coral host against predators. The only species recorded from the UAE is *Tetralia glaberrima*.

The remaining xanthoids are mainly carnivores, often robust and slow-moving, with one claw specialised as a powerful crusher, adapted to deal with hard prey such as molluscs or other crabs. Within the superfamily the family Pilumnidae includes small and inconspicuous species such as the hairy *Pilumnus vespertilio*, as well as the purple and white *Eurycarcinus orientalis*, common in mangrove lagoons. Largest of the xanthoids is *Carpilius convexus* (family Carpiliidae), which can reach 14 centimetres in breadth. *Carpilius* occasionally appears in souqs, although it is not rated highly as food (Guinot 1966).

Many other species are found in the UAE. Spider or decorator crabs (family Majidae) camouflage themselves by attaching weed, sponges or shells to velcro-like bristles on their carapace: in some species attached weed also serves as a travelling larder. The sponge

crab *Dromidia unidentata* trims a sheet of sponge to fit its carapace, holding it in position with its diminutive last pair of legs. The Leucosiidae are poorly known. Several species occur in the UAE, although only three have been identified. *Philyra scabriuscula* occurs low on sandy beaches, and *Ebalia sagittifera* and *Pseudophilyra blanfordi* in mangroves. The only member of the family Calappidae recorded from the UAE is *Matuta lunaris*, a strange-looking animal whose walking legs are paddle-like, for swimming and for digging into sand.

CRAB RELATIVES (ANOMURA)

Related to the true crabs (Brachyura) are the Anomura, a mixed group that includes hermit crabs, porcelain crabs and others. Hermit crabs often have impressive claws but, unlike true crabs, their abdomen is soft. They protect themselves by occupying snail shells.

Like other crustaceans, hermits increase in size stepwise, after moulting. Whenever a hermit increases in size, it must not only cope with the hazards of moulting, but also find a snail shell to match. Much time is spent squabbling over shells, generally in short supply.

The commonest hermit species in the UAE is the small *Diogenes avarus*, often aggregating in large numbers in mangroves. *Clibanarius longitarsus*, also found in mangroves, grows to a few centimetres in length and is often found in *Terebralia* shells. Largest is *Dardanus tinctor*, a subtidal species that is occasionally caught in fish traps.

Porcelain crabs are easily overlooked. *Petrolisthes rufescens*, red in colour and with the glossy surface that gives their common name, is found in mangrove mud. Its mouthparts carry long flexible bristles, and it feeds by wafting these to and fro in the water to sieve out fine particles.

Finally, the mole crab *Emerita holthuisi*, lives in sandy beaches. It is rarely seen on the surface, but moultskins may be common on the strandline.

Peter Hogarth and Mark Beech



Eurycarcinus orientalis is commonly found in mangrove lagoons.