

TERRESTRIAL REPTILES

THE TERRESTRIAL REPTILES OF THE UAE COMPRISE the lizards, snakes and a single species of amphisbaenian or worm lizard. There are no extant native crocodiles, tortoises or freshwater terrapins. Lizards, snakes and amphisbaenians are all classified under the reptilian order Squamata, in the suborders Sauria, Serpentes and Amphisbaenia respectively. Characterised by their dry, scaly skin, which protects them from drying out, and by their reliance on external heat sources to maintain their body temperatures, reptiles are well-suited to hot and arid areas. In Arabia, reptiles are a major component of the desert and mountain ecosystems and a total of at least 54 species of terrestrial reptile are found in the UAE. So far, a comprehensive handbook covering all of the UAE reptiles in detail is not available. The *Handbook to Middle East Amphibians and Reptiles* (Leviton *et al.* 1992) does not cover the species of the mountains or Northern Emirates and gives little information on natural history. Useful general sources of information are *Wild about Reptiles* (Jongbloed 2000) and *Terrestrial Reptiles of Abu Dhabi* (Baha El Din 1986).

There is no agreement on common names for most of the reptile species and although some locally used names may distinguish species within the country, they may not be specific enough in an Arabian context. Thus, the two species of *Echis* vipers are generally known locally as the 'carpet viper' for *E omanensis* and 'saw-scaled viper' for *Echis carinatus sochureki* (Hornby 1996). However, elsewhere all *Echis* species are known as saw-scaled vipers (and all have saw-keeled lateral scales) or carpet vipers. Many of the names in *A Complete Guide to the Scientific and Common Names of Reptiles and Amphibians of the World* (Frank

and Ramus 1995) are misleading. The accompanying checklist (page 360) attempts to standardise the common names for the UAE species, using widely recognised names, names from Frank and Ramus (1995) where appropriate, and by providing alternative names elsewhere.

No nationally endemic species of reptile have been identified in the UAE. This is not surprising as all the major habitat types are also present in adjacent Oman and Saudi Arabia. However, some of the mountain species are endemic to the northern Oman and UAE mountains, and hence are categorised as regional endemics.

LIZARDS

Lizards are probably the most familiar of all reptiles, and are abundant in almost every UAE habitat from city to mountaintops. A wide diversity of lizards from five families live in the Emirates. Notwithstanding popular belief, none are poisonous. Most of the UAE's lizards are small, with the exception of the two species of *dhab* or *dhub* (spiny-tailed agamid) and the desert monitor. Many lizards shed their tails as part of their escape strategy from predators, and their measurements are usually expressed as 'snout to vent length' or SVL, measured from the tip of the snout to the opening of the cloaca. The most important guide to identification is the key and annotated checklist to Arabian lizards and amphisbaenians by Arnold (1986), and Arnold's earlier study of the ecology of the lowland lizards of the Northern Emirates (Arnold 1984) remains the most detailed ecological study.

CHISEL-TEETH LIZARDS (FAMILY AGAMIDAE)

The agamids are a diverse Old World family of diurnal lizards with six species known from the UAE. They are supremely adapted to the desert. The family gets its common name from its specialised teeth which are not set in sockets, as in other lizards, but are firmly fused to the teeth-bearing bones. In the vegetarian *dhub*s, the teeth wear down with age, and the bone develops sharp cutting edges. Most species can change colour as part of their temperature regulation or behavioural repertoire.

The genus *Phrynocephalus* (toad-headed agamas) is a large genus of mainly desert agamas found across Asia (Arnold 1999), with two species in the UAE. The Arabian toad-headed agama *Phrynocephalus arabicus* is a small diurnal lizard of sandy habitats. They prefer warmth and are active in all but the hottest hours of the day. On cold winter days they may remain dormant. Highly adapted to life in loose sand, they have fringes of long scales to keep the sand grains out of their eyes, fringes on their longest toe, and no external ear opening. The head is short with a deep forehead and snub nose. On hot

Leptien's spiny-tailed lizard *Uromastyx leptieni*





ABOVE: *Phrynocephalus arabicus* half buried in the sand

RIGHT: *The Sinai agama* *Pseudotrapelus sinaitus*

BELOW: *Pseudotrapelus flavimaculatus* displaying



days they stand high on extended legs, and limit contact with the sand by balancing on their fingertips and heels, using the tail as a prop. They are variable in colour with a pattern of black, white and rufous markings and tend to match their background, with lizards from pale coastal sands being much paler and less patterned than those from red, inland sands. The underside of the tail has a black tip, which becomes a highly visible signal when the tail is lifted and curled. Toad-headed agamas can sink into the sand by rapidly vibrating their bodies, a process sometimes called 'shimmy burial'. The spotted toad-headed agama *Phrynocephalus maculatus* is slightly larger, less mottled and has distinct brown bars crossing the body and tail. It prefers harder sandy surfaces and is one of the few reptiles associated with sabkhas (Loughland and Cunningham 2002).

The Sinai agama *Pseudotrapelus sinaitus* is a colourful lizard of the mountains and foothills. Males may be completely sky-blue, or can have a blue head and throat with a brown body. Females may lack blue, but, like juveniles, often have a red crescent-shaped spot behind the axillae. The ear opening is large and round. They do not display a gular sac. Fast and agile climbers on rocks and shrubs, they often adapt a 'sit and wait' strategy in hunting. The somewhat similar yellow-spotted agama *Trapelus flavimaculatus* is readily distinguished by its



heavier build, rougher scales and the presence of a gular sac which is darkened and inflated as a threat display. The ear opening is smaller and its dorsal margin is partially covered by pointed scales. They too can develop blue colour on the back and head, though this is mottled with cream scales, and the tail is orange. In the summer these lizards often sit atop *Acacia* trees or prominent rocks as a territorial display and to regulate temperature.

Largest of the agamas are the two species of spiny-tailed lizards or *dhubs*. These archaic-looking reptiles (sometimes mistaken by the credulous for small dinosaurs) are hardy vegetarians. A related North African species can survive a year of fasting and takes a month to digest a meal (Schleich *et al.* 1996). It was originally thought that all UAE *dhubs* were the Egyptian spiny-tailed lizard

Uromastix aegyptia microlepis, but recently a second species, Leptien's spiny-tailed lizard *Uromastix leptieni*, has been recognised from the northern part of the country (Wilms and Böhme 2000). The juveniles are easy to distinguish, with *leptieni* being an overall dark grey, while *aegyptia* is lighter grey-brown with yellow dorsal cross bars and spots. The adults are more difficult to identify, but *leptieni* has coarser scalation and enlarged flank scales. The range of the two forms meets somewhere between Sweihan and Jebel Ali. Spiny-tailed lizards live in colonies and require firm sand, soil or soft rock in which to dig their extensive and deep burrow systems. They bask at the burrow entrance, and slowly change colour from black to white and yellow as they warm up. Once warm, they may take a circular walk from the burrow, visiting shrubs to browse. They are far more active in the summer, with an activity peak between 0700 and 1100 (Cunningham 2000a; 2000c). On cooler winter days they remain inside the burrows.



Uromastix juveniles

GECKOS (FAMILY GEKKONIDAE)

Geckos belong to one of the most diverse families of lizards. While most other lizards are ground-dwellers and active during the day, the majority of gecko species are nocturnal, some being amongst the best climbers in the Animal Kingdom. They are the best represented lizard family in the UAE, with 17 species recorded. They have soft skin with small scales, including those on the top of the head. The head is typically depressed, with large eyes. The eyelids are fused together, forming a transparent spectacle. As they cannot blink, geckos lick their eyes to clean them. In the nocturnal species, the pupil contracts to a vertical slit with a series of pin-holes in daylight to protect the sensitive retina. In the dark, the slit opens wide to catch the maximum amount of light. The semaphore geckos have vertically ellipsoidal pupils which cannot contract to a slit. Many geckos are able to produce calls, and indeed the name 'gecko' derives onomatopoeically from the call of the south-east Asian tokay.

Geckos have remarkable climbing skills, with house geckos having no difficulty in ascending vertical walls, walking upside down on the ceiling or even across panes of glass. The gecko toe-pads do not use suction. Instead, each of the specialised scales, called scansors, on the underside of the toes has up to 150,000 microscopic hair-like setae. Each of these branches at several levels, giving rise to hundreds of saucer-shaped end plates. The total surface area of these plates is enormous relative to the size of the gecko. Blood-filled sinuses within the toes press the pads firmly to every microscopic irregularity on the climbing surface, ensuring a firm grip and allowing such a close contact that intermolecular forces give the geckos a toehold on even the most slippery of surfaces (Autumn *et al.* 2000). Non-climbing geckos, such as the sand geckos, lack scansors.

Two species of leaf-toed geckos of the genus *Asaccus* found in the Hajar Mountains are particularly colourful. The Musandam leaf-toed gecko *Asaccus caudivolvulus* was only

described as a separate species in 1994 (Arnold and Gardner 1994), and is endemic to the Musandam region and the mountains of the eastern UAE. Medium-sized and slender, reaching 62 millimetres SVL, it has a flattened head with a broad snout and distinct neck. The toes each have a pair of scansors which project well beyond the claws so that the toes appear heart-shaped. Strictly nocturnal, these geckos live in caves and crevices in the mountain wadis. The related, but smaller, Gallagher's leaf-toed gecko *Asaccus gallagheri*, has a more widespread distribution from Musandam, through the Hajar Mountains to the Hajar ash

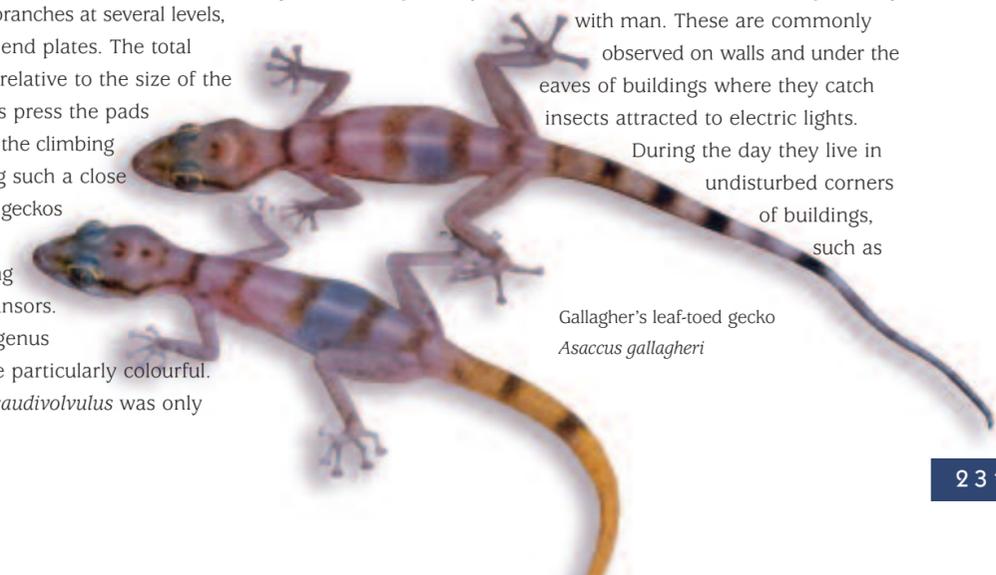
Sharqi in central Oman and is also endemic to the region. It lacks tubercles on the back, and is unusual in that the sexes are clearly dimorphic. The males have bright golden-yellow tails while those of the females are banded black and white. Both species glue their single, hard-shelled and spherical egg to the rock deep in crevices within caves and cliffs, often using traditional, communal laying sites. In captivity they lay repeat clutches at intervals of three to four weeks (Leptien 1996; Leptien *et al.* 1993; 1994; Vogel 1989).

Another climbing gecko found in the mountains is the common fan-footed gecko *Ptyodactylus hasselquistii*. These are large and long-legged with distinctive toes that have a fan-like arrangement of scansors. Excellent climbers on cliffs, they can often be found during the day in caves, deeply-shaded overhangs or ruined buildings. They also glue their eggs to the rock in communal laying sites in caves and, in common with the vast majority of gecko species, lay a clutch of two. Fan-footed geckos usually live in groups and several are often found sharing the same crevice. They may be quite vocal, with males in particular calling to each other with a series of chirrups.

The only other scansorial geckos in the UAE are the two *Hemidactylus* species. The yellow-bellied house gecko *Hemidactylus flaviviridis* is probably the most familiar as it lives in close proximity

with man. These are commonly observed on walls and under the eaves of buildings where they catch insects attracted to electric lights.

During the day they live in undisturbed corners of buildings, such as



Gallagher's leaf-toed gecko
Asaccus gallagheri

RIGHT: Examples of the *Stenodactylus* species that are present in the UAE
 FROM TOP: Dune sand gecko *S. donae*, east sand gecko *S. leptocosymbotes*
 and Gulf sand gecko *S. khobarensis*
 BELOW LEFT: Skink gecko *Teratoscincus scincus*

in air conditioning ducts or even behind pictures on the wall. Usually solitary and holding a territory, they are relatively large (up to 95 millimetres SVL) with broad toe pads, flattened bodies and, sometimes, fat tails. They vary in colour, being an almost translucent, pinkish-brown at night, but showing a pattern of dark chevron markings if disturbed during the day. The related, but much smaller, Turkish gecko *Hemidactylus turcicus* occupies a much wider range of habitats from the rough bark of desert *ghaf* trees *Prosopis cineraria*, to rocky outcrops, to the date palms on city streets.

The desert geckos of the genus *Stenodactylus* illustrate the adaptation of the gecko toes for different habitats. The largest species, the dune sand gecko *Stenodactylus doniae*, reaches 83 millimetres SVL and lives on fine, wind-blown sands, where they walk slowly at night, raised high off the surface on their long legs. They have flattened toes with projecting fringes of long scales to increase the surface area in contact with the loose sand. Compared to the size of the body, the head is large, probably to accommodate very large eyes. Another soft-sand dweller, the Arabian sand gecko *Stenodactylus arabicus* is much smaller (up to 40 millimetres SVL). Its webbed toes increase the foot surface area for burrowing and walking on soft sand. This small species lays a single egg (Leptien 1992). Other desert geckos found in the UAE are the east sand gecko *Stenodactylus leptocosymbotes* and Gulf sand gecko *Stenodactylus khobarensis*, which live on gravel plains and *sabkhas*, respectively. These species of firmer surfaces have rounded toes. Another sand gecko, Slevin's sand gecko *Stenodactylus slevini*, looks very similar to the dune sand gecko, but has a chevron mark on the back of the head, and less flattened fingers. It prefers firmer sandy plains. Detailed treatment of the sand geckos is given in Arnold (1980).

The largest, and arguably the most beautiful, gecko in the UAE is the skink gecko *Teratoscincus scincus*, also found in central Asia, eastern Iran, Afghanistan and Pakistan. Within Arabia, it is restricted to the northern parts of the UAE, being found in areas of low,

undulating sand dunes and gravel plains. The head is large and the eyes are particularly reflective allowing the geckos to be located with a spotlight by their eye shine, which is visible from over 150 metres (Osborne 1994). When disturbed they can emit



a loud hissing sound by rubbing their large overlapping back and tail scales together. The skin is very fragile and can be autotomised (discarded) as an escape strategy (Bauer *et al.* 1989; 1993). Hence these geckos should not be caught by hand.

In the UAE there are three aberrant species of gecko which are active during the day. These are the semaphore geckos of the genus *Pristurus*, so named because they use their tails to signal to each other. The tiny rock semaphore gecko *Pristurus rupestris* is the most common and is found in both the mountains and other rocky areas and in cities, including Abu Dhabi and Dubai, where they can sometimes be observed on walls and in gardens. They frequently interact with other individuals using a variety of signals, including vertical tail curling, wagging the tail from side to side, tail flicking, along with various body postures. The precise meanings conveyed by these signals are not yet fully understood (Ross 1990). Males have a crest of pointed scales along the top of the tail.



The other species of semaphore gecko also signal with body postures and their tails, but using different languages of gestures. The bar-tailed semaphore gecko *Pristurus celerrimus* is larger, reaching about 40 millimetres SVL and has a longer, barred tail. It is found in the Hajar Mountains, and in the limestone mountains of the Ru'us al-Jibal, where they are abundant, reaching the highest altitudes (Bischoff 1989; Leptien 1993a). The least semaphore gecko *Pristurus minimus* lives on the sand and gravel outwash plains and on the coastal plains of the eastern UAE. This inconspicuous and tiny gecko (usually less than 27 millimetres SVL) lives within clumps of vegetation and is easily missed. It was discovered in the UAE in 1989 (Böhme and Leptien 1990).

There are three further species of ground-dwelling geckos in the Emirates. The Baluch ground gecko *Bunopus tuberculatus* is an abundant and widespread species of vegetated sandy plains and coastal habitats (Leptien 1993b). They dig burrows in the sand,

LEFT: Other gecko species found in the UAE include (FROM TOP): banded ground gecko *Bunopus spatulurus hajarensis*, least semaphore gecko *Pristurus minimus* and rock semaphore gecko *P. rupestris*.
 BELOW RIGHT: Common fan-footed gecko *Ptyodactylus hasselquistii*

but also hide under surface debris. They have rather short toes, conspicuous tubercles on the back and flanks and a long barred tail. A prominent dark stripe through the eye is seen on younger specimens, but may fade with age. The banded ground gecko *Bunopus spatulurus hajarensis* can be found in the mountains and gravel outwash plains (Leptien and Zilger 1991a; 1991b). They have prominent dark cross bars and tubercles arranged in six continuous fine lines down the back. The tail is truncated. The rough-tailed bowfoot gecko *Cyrtopodion scabrum* can be confused with *B. tuberculatus*, but has the tubercles arranged more regularly and usually has well-defined dark spots. The toes are longer than for the other ground geckos, laterally compressed and distinctly kinked. A final diagnostic feature is the presence of two pairs of enlarged scales under the chin. *C. scabrum* are usually found in disturbed habitats such as in towns, oil camps and desert farms.



WALL AND SAND LIZARDS (FAMILY LACERTIDAE)

The lacertids are well represented, with at least nine species in three genera in the UAE. Lacertids are sometimes known as 'typical' lizards by Europeans as they are the most common lizards of that continent. They are usually small- to medium-sized, diurnal lizards, with enlarged scales on top of the head, long, fragile tails and square or rectangular belly scales arranged in well-defined rows. They are generally alert and very fast.

The five species of fringe-toed lizards belong to the large genus *Acanthodactylus*, typically Saharo-Sindian, with species ranging from Spain, across North Africa, Arabia to Afghanistan, Pakistan and India (Arnold 1983). Colour patterns are variable and tend to change with age. The most abundant species in the UAE is Schmidt's fringe-toed lizard *Acanthodactylus schmidtii*, found in sandsheets and dunes, wherever there is sufficient vegetation to support their burrow systems and insect prey. They have highly-developed scale fringes on their toes to aid locomotion on soft sand. Schmidt's fringe-toed lizard has a pattern of small pale spots, and never has longitudinal stripes, even when young. The other four species all have striping to some degree. *A. gongrorhynchatus* and *A. haasi* are also sand dwellers with well-developed toe fringes. *A. gongrorhynchatus* has a narrow snout with swollen nostrils and a blue tail in immatures. *A. haasi* is the only fringe-toed lizard that regularly climbs in small shrubs, and has a yellow tail when young.



The other two species live in the outwash gravel plains in the eastern UAE, and have much shorter toe fringes. Bosk's fringe-toed lizard, *Acanthodactylus boskianus*, is large (up to 95 millimetres SVL), with highly-keeled dorsal scales giving it a very rough appearance, while *A. opheodurus*, the snake-tailed fringe-toed lizard, is smaller (up to 65 millimetres SVL) with a particularly long tail, tinged red in immatures. Arnold's key (Arnold 1986) is useful for confirming identifications.

The two species of sand lizards in the genus *Mesalina* are close relatives of the fringe-toed lizards, but differ in having the nostril well separated from the first upper labial scale, and lacking the toe fringes. The Hadhramaut sand lizard *Mesalina adramitana* has well-developed longitudinal stripes including a dark stripe along each side, contrasting with the paler flanks below. It is found on



firmer sand sheets and gravel plains. The slightly larger short-snouted sand lizard *Mesalina brevirostris* is more mottled and is found in coastal areas from Sharjah to western Abu Dhabi, often foraging on the beach crest. Observations on their distribution and behaviour in eastern Saudi Arabia are reported by Ross (1988).

The two species of Oman lizards, now classified in their own genus *Omanosaura* (Harris *et al.* 1998; Lutz *et al.* 1986), are regional endemics to the northern Hajar Mountains, including the UAE. Jayakar's Oman lizard *Omanosaura jayakari* is the largest lacertid in the region and is easily identified by its large size (up to at least 200 millimetres SVL) and small blue or grey spots. It is an active hunter in mountain wadis and hillsides, where it is quite common. The blue-tailed Oman lizard *Omanosaura cyanura* is much smaller and less frequently seen. The dorsal colour of adults may be entirely electric blue, or this colour may be restricted to the tail, with the body being uniform brown. Juveniles have a strong pattern of black and cream longitudinal stripes, though they too have a long blue tail. In captivity it laid clutches of three eggs at intervals of roughly three weeks (Leptien 1995; Leptien and Böhme 1994).

TOP LEFT: Bosk's fringe-toed lizard *Acanthodactylus boskianus*
 TOP RIGHT: Short-snouted sand lizard *Mesalina brevirostris*
 CENTRE LEFT: Snake-tailed fringe-toed lizard *A. opheodurus*
 CENTRE RIGHT: Blue-tailed Oman lizard *Omanosaura cyanura*
 BOTTOM LEFT: Jayakar's Oman lizard *Omanosaura jayakari*



CLOCKWISE FROM TOP LEFT: Four of the five species of skinks recorded in the UAE – Asian snake-eyed skink *Ablepharus pannonicus*, eastern sandfish *Scincus mitranus*, tessellated skink *Mabuya tessellata* and ocellated skink *Chalcides ocellatus*

has also been recorded on a gravel plain (Baha El Din 1986). It can be differentiated by its lack of dark vertical bars on the flanks.

The ocellated skink *Chalcides ocellatus* is a brown skink of gardens and farms, with a mainly coastal distribution in Arabia. It has been recorded in inland localities in Oman

SKINKS (FAMILY SCINCIDAE)

The skinks are medium-sized lizards, often with shiny or iridescent scales and reduced legs. The scales overlap strongly and are underlain with bony plates giving their bodies protection from predators and a rigidity that suits their burrowing habits. Five species are recorded in the UAE. Perhaps best-known and most often seen is the aptly named eastern sandfish *Scincus mitranus*. These handsome lizards dive beneath the sand surface and 'swim' through the sand by lateral undulations of their powerful bodies. When there is no perceived danger from predators, sandfish move across the surface of the dunes. Their characteristic tracks with a broad body groove criss-cross the dune slip-faces throughout the country. Sandfish are superbly adapted to their habitat, with highly polished skin and a streamlined, chisel-shaped snout to reduce drag. The body and tail base are thick and muscular. The mouth is recessed and the ear openings are small, although they have excellent hearing, used to locate insects such as beetle larvae moving below the surface. Sandfish have an overall golden-pink colour, with each scale edged in black. A series of golden bars or crescents run down the sides of the back, with a further row of dark bars on the flanks. A very similar species, the Iranian sandfish *Scincus scincus conirostris*, occurs in southern and western Abu Dhabi Emirate. This much less common species lives in sand but

and at Al Ain (Cunningham 2002b), though it may have colonised these areas with the spread of agriculture. Secretive, they burrow in leaf litter, but in suitable habitat they can easily be found by turning rocks and wood. They are typical skinks with shiny scales and small limbs. The back has a pattern of black and white scales forming the 'eyes'. A similarly-sized skink, though with more developed legs and lacking the eyed pattern, lives in wadis and screes in the Hajar Mountains and foothills. This is the tessellated skink *Mabuya tessellata*, also found in Yemen and Oman. The Asian snake-eyed skink *Ablepharus pannonicus*, even more secretive, also



lives in the mountains. A small and slender skink, it lacks eyelids and is usually only glimpsed as a silvery shape darting into dense cover. The limbs are slender, though well-developed, and it may have cream and dark longitudinal stripes down the body.

MONITOR LIZARDS (FAMILY VARANIDAE)

By far the largest lizard in the country, sometimes reaching over a metre in total length, the desert monitor *Varanus griseus* has an elongate body, long tail and sturdy limbs. Juveniles have bold black and yellow transverse bands, especially on the tail. Adults are more subdued in colour, but the dark bands can still be distinguished amongst a pattern of cream spots and mottling. The head is long, and the monitors have a forked tongue, flicked in and out like that of a snake to scent the air. They have prominent yellow eyes and sharp needle-like teeth. When threatened, they inflate their bodies, hiss and lash out with the tail. They can inflict severe bites which may become septic. They are active hunters, sometimes covering 6–8 kilometres in a day, and have also been recorded swimming in the UAE in an attempt to predate on chicks of wading birds (Khan 1993). Prey is other reptiles, small mammals, birds, insects

and carrion (Schleich *et al.* 1996). They either dig burrows with their powerful clawed legs or utilise those of other animals, and are most active in the morning and late afternoon, avoiding the hottest part of the day.

WORM LIZARDS OR AMPHISBAENIANS

The single species of worm lizard in the UAE, Zarudnyi's worm lizard *Diplometopon zarudnyi*, is rarely seen, though it is common in sandy habitats throughout the country. Its distinctive trail of alternate swirls, left when the animal is moving fast on the surface, is more often observed. Zarudnyi's worm lizard uses its pointed tail as a fulcrum and curls its body forward in a series of lunges. The name 'amphisbaenian' derives from the Greek meaning 'to walk on both sides'. At first glance both ends look alike, as there are no distinct eyes or tapering tail, and this odd reptile looks rather like a plump, pinkish earthworm. It spends the day buried deep in the sand, but at night may move several hundred metres on the surface seeking its prey of insects and geckos. They have excellent hearing and smell, and are effective predators. Lacking venom, worm lizards are quite harmless to humans.



ABOVE LEFT: Hooked thread snake *Leptotyphlops macrorhynchus*
ABOVE RIGHT: Jayakar's sand boa *Eryx jayakari*
BELOW: Wadi racer *Platyceps rhodorachis*

THREAD SNAKES (FAMILY LEPTOTYPHLOPIDAE)

Thread snakes are the smallest of all snakes. They have no teeth in the upper jaw, tiny eyes and are generally burrowers, though some species live in birds' nests. A single species, the hooked thread snake *Leptotyphlops macrorhynchus*, is found in the UAE. This is one of the smallest thread snakes, with a maximum length in Arabian specimens of less than 200 millimetres, a diameter of about 2 millimetres, and weighing less than half a gram. The entire body is pink with no obvious markings, and the eyes are just visible as small black dots. Burrowers in sand and soft soil, they are only rarely seen on the surface, usually at night or when washed out after rain. They are specialist termite feeders, though may sometimes feed on ants and other small insects. The hooked thread snake has been recorded at Sharjah, Dhaid and Al Ain. The tail is at least three times longer than broad, which differentiates it from the flowerpot snake which has a tail only slightly longer than broad. A recent report from Iran indicates that the wadi racer *Platyceps rhodorachis* may occasionally feed on thread snakes (Mulder 2002). Hooked thread snakes also occur in north and eastern Africa, through much of Arabia and in Khuzistan and Bushahr provinces of Iran.

BOAS (FAMILY BOIDAE)

The single species of boa in south-eastern Arabia, Jayakar's sand boa *Eryx jayakari*, is probably one of the most common snakes in the UAE, and its sinuous tracks are almost ubiquitous in areas of sandsheets and dunes. Nocturnal and fossorial, it is rarely seen. Its shape is adapted for burrowing and moving through soft sand, the chisel-shaped snout, recessed mouth, protected nostrils and highly-polished scales all reducing friction under the sand, these adaptations being similar to those of the sand fish, *Scincus mitranus*. With its eyes on the top of the head, Jayakar's sand boa can remain submerged in the sand and still observe surface prey, which includes geckos such as the *Stenodactylus* species, and *Bunopus tuberculatus*. It may also eat worm lizards. Unusual amongst the Boidae, Jayakar's sand boas are viviparous. An individual from Saudi Arabia laid seven eggs (six fertile), which

hatched after 66 days incubation at 31–33 °C. Hatchlings do not have an egg tooth (Staub and Emberton 2002). Sand boas have vestigial hind limbs, visible as claws on either side of the vent. They have no venom or fangs, and kill prey by constriction. Maximum length is 64 centimetres.

COLUBRIDS (FAMILY COLUBRIDAE)

The Colubridae is by far the largest of the snake families, including some 70 per cent of all snake species. Most species, including those from the UAE, are not dangerous to man. Colubrids with venom are rear-fanged, and inject venom using a pair or cluster of grooved maxillary teeth around the middle of the upper jaw. Seven colubrid species have been recorded or are expected to occur in the UAE, of which three are rear-fanged, all with a mildly toxic venom. Usually long, slender and fast-moving, they have large scales on the top of the head.

The range of the wadi racer *Platyceps rhodorachis* includes North Africa, Arabia and south-western Asia. In the UAE, this species is found in most wadis with permanent water, though they can also



SNAKES

Snakes are rarely encountered in the Emirates, despite there being at least 14 species of terrestrial snakes. (For information on sea snakes, see the chapter on *Marine Reptiles*). Being predators high in the food chain, they usually occur at low densities in deserts. Many species are nocturnal or cryptic.

Of the terrestrial snakes, only four are dangerously venomous, while a further three species are rear-fanged colubrids with relatively mild venom. Although cases of snake bite are very infrequent, it is wise to remember that there are dangerous snakes inhabiting most parts of the UAE, in addition to other venomous creatures such as scorpions, spiders, wasps and bees. Sensible precautions include wearing stout shoes or boots in the desert (especially at night), and taking great care when clearing vegetation and rubbish, collecting firewood or lifting stones.

The key reference work is the seminal paper on Arabian snakes by Gasperetti (1988) and much of the information presented here is drawn from that work. The booklet on *Snakes of the Arabian Gulf and Oman* by Michael Gallagher serves as a good introduction (Gallagher 1993).

TYPICAL BLIND SNAKES (FAMILY TYPHLOPIDAE)

Blind snakes are small, primitive snakes which lack enlarged ventral scales and have vestigial eyes. *Ramphotyphlops braminus*, the Brahminy blind snake or flowerpot snake, is the only species found in the UAE. This is the most widespread snake species in the world, though looking more like a dark, shiny earthworm than a true serpent. Harmless and small (up to 170 millimetres total length), it derives its name from its habit of burrowing in soft,

moist soil in gardens. It is occasionally encountered in the UAE, although probably often overlooked. Despite its appearance, it is a true snake, and one with a fascinating way of reproducing. No male has ever been recorded (Gasperetti 1988). The females lay small clutches of unfertilised, thin-shelled eggs which hatch into miniature snakes, all females. This peculiar way of reproducing is called 'parthenogenesis' and is also known in some species of lizards. The flowerpot snake is the only snake species known that always reproduces parthenogenetically. The species probably originated in the south-west Pacific region, but has become established on oceanic islands such as the Seychelles and Madagascar, and is now found in India and Southeast Asia, Africa, Australia, Central and South America and Florida. Blind snakes have probably been introduced to Arabia in imported garden soil. It is not known whether they are able to form viable populations in the UAE.

Brahminy blind snake or flowerpot snake *Ramphotyphlops braminus*



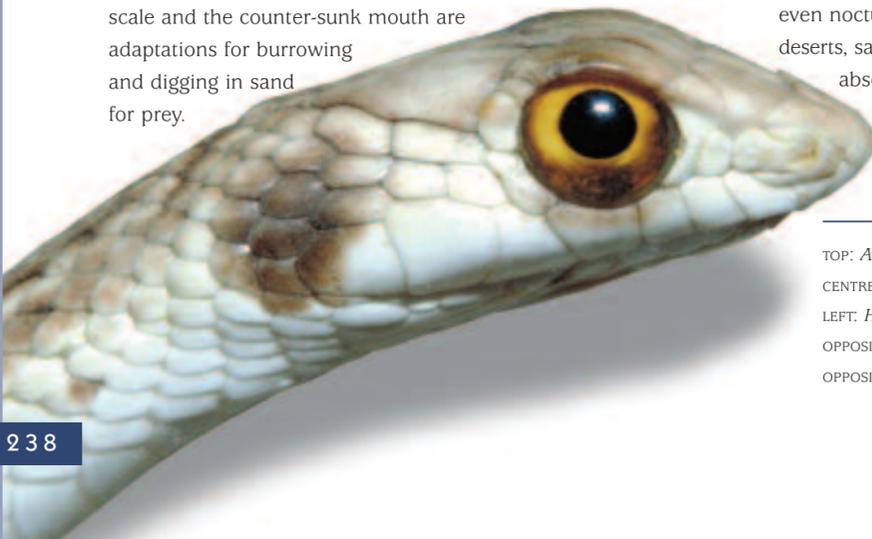
live in dry desert regions and mountain-sides. They are fast, agile and slender snakes, diurnal or crepuscular in habits. Wadi racers have no fangs, though their saliva may have a mildly toxic effect (Perry 1988).

Most individuals are less than a metre long. Wadi racers are highly variable in colour and pattern. UAE specimens occur in two main colour phases; either well patterned and greenish-grey, or an almost unmarked dull tan. Patterned individuals have dark grey heads with distinctive creamy markings immediately in front and behind the eyes. There is a dark band below the eye and two further dark bars on each side of the head. On the front two-thirds of the body are up to 100 darker bars over the back and sides. The ground colour and barring become paler and less distinct further back, and the tail is usually plain and a pinkish brown. Unmarked individuals also show the creamy bars in front of and behind the eyes, and have pinkish tails. The belly is white with an iridescent pinkish sheen.

In wet wadis, these snakes are often semi-aquatic and hunt for fish, tadpoles and, perhaps, other wadi racers (Cunningham 2000b; 2002c). A favourite retreat is in small crevices just above the water level. In Oman, they have been observed feeding on fish on rocky seashores. They climb with ease on near-vertical rock faces.

Hardwicke's racer *Platyceps ventromaculatus* is a species with a range around the northern Arabian Gulf, Iraq, Iran, Pakistan and northern India. It is quite common in Bahrain, but the only UAE records are from Sir Bani Yas. Long and slender, these snakes reach a maximum length of 90 centimetres. Diurnal, they prefer inhabited areas with water sources, such as farms and date gardens, where they subsist on rats. Colouration is variable, but there is generally a series of dark bars or spots down the back on a paler grey or olive background. There are spots on the flanks, and a dark bar across the head between the eyes, ending in a comma shape in a white spot beneath the eye. They have no venom.

The awl-headed or leaf-nosed snake *Lytorhynchus diadema* is a small snake, harmless to man, and found in sandy habitats. It has a distinctive enlarged rostral scale and head marking consisting of a chocolate brown circle or ring on the parietals, usually joining a brown bar between the eyes. The large and sharp-edged rostral scale and the counter-sunk mouth are adaptations for burrowing and digging in sand for prey.



The hooded malpolon *Malpolon moilensis* has a range through Northern Africa from Morocco to Egypt and Sudan, in south-west Asia from Jordan, Iraq, south-western Iran, and throughout Arabia. The maximum length is about 150 centimetres, with females being larger and having proportionally shorter tails than males (Schleich *et al.* 1996). The hooded malpolon is a fast-moving diurnal snake with a chequered pattern and large, hooded eyes with round pupils and orange or red iris. The head, clearly distinct from the neck, has a pointed snout which protrudes over the mouth. There are poison sacs and one or two very large grooved fangs situated just behind the eye, but the snake is not considered dangerous to humans.



When disturbed the hooded malpolon lifts the front third of its body off the surface, holds it at an angle of 45° to the ground and spreads a hood, this behaviour giving rise to reports of 'cobras' in the UAE. Normally diurnal, these snakes may be crepuscular or even nocturnal during the summer. Found in gravel and stony deserts, sandy coastal regions and cultivations, they are apparently absent from pure sand deserts and mountains.

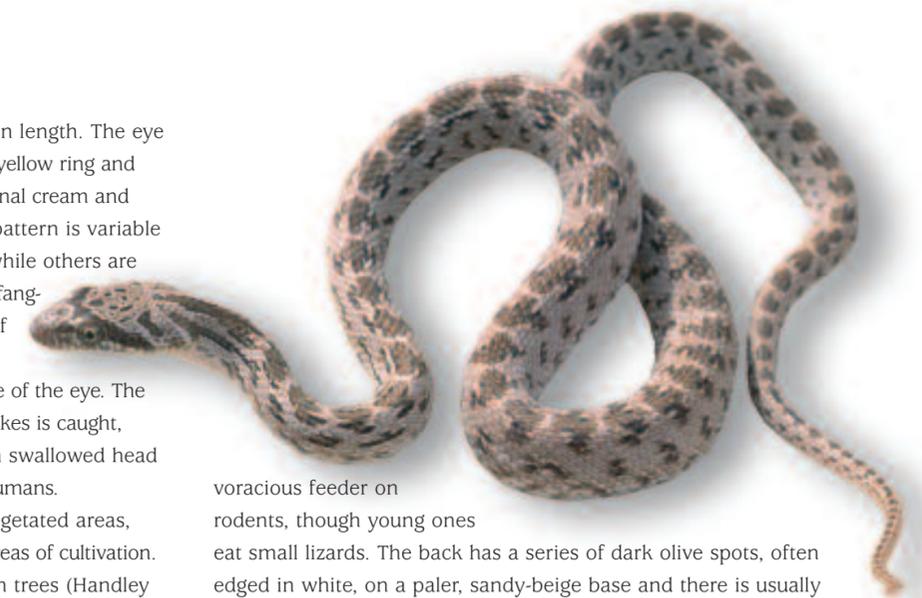
The Schokari sand racer *Psammophis schokari* also has a wide range, from North Africa to Nepal. They are thin, fast-moving, diurnal snakes with distinct neck,

TOP: Awl-headed or leaf-nosed snake *Lytorhynchus diadema*
CENTRE: Schokari sand racer *Psammophis schokari*
LEFT: Hooded malpolon *Malpolon moilensis*
OPPOSITE TOP: Diadem snake *Spalerosophis diadema cliffordi*
OPPOSITE BELOW: Arabian cat snake *Telescopus dhara*

elongate head, and may reach 150 centimetres in length. The eye is large with a round pupil surrounded by a pale yellow ring and golden-brown iris. The body pattern is of longitudinal cream and dark stripes on an olive or tan background. This pattern is variable with some snakes being conspicuously striped while others are almost uniform. There is a pair of non-venomous fang-like teeth in the upper jaw at the anterior edge of the eye, and one or two pairs of strongly enlarged and grooved venomous fangs at the posterior edge of the eye. The prey of lizards, small birds, rodents and other snakes is caught, chewed to immobilise with the venom, and then swallowed head first. The venom is not considered dangerous to humans.

These snakes are relatively common in well-vegetated areas, especially those with trees and shrubs, including areas of cultivation. Excellent climbers, they are able to catch birds in trees (Handley and Cunningham 2000). They are also found in sand and gravel areas with low shrubs and grasses and occur from sea level to the mountain summits.

The diadem snake *Spalerosophis diadema cliffordi* is also found across North Africa, Arabia and eastwards to northern India and Nepal. It can reach 130 centimetres, though is usually less than a metre long, and is relatively heavier-bodied than the racers. It is a



voracious feeder on rodents, though young ones eat small lizards. The back has a series of dark olive spots, often edged in white, on a paler, sandy-beige base and there is usually a dark band (the diadem) running across the head between the eyes. A series of sub-ocular scales separates the eye from the labials, a feature distinguishing the diadem snake from all other colubrids in the UAE. Although it strikes readily when cornered, it has no venom and no serious effects of its bite on humans have been reported. It is apparently rare in the UAE having only been recorded from the Tayyibah Plain and Al Ain.



The Arabian cat snake *Telescopus dhara* has a widespread distribution in Arabia, and is known from the Jebel Akhdar and Ru'us al-Jibal mountains in Oman within a few kilometres of the UAE border. It is therefore likely to occur in the UAE. Nocturnal, it has very large eyes with vertically elliptical pupils and is an opaque greenish-grey or reddish-brown iris. The overall colouration is pinkish brown, with a highly variable degree of dark marking. Maximum recorded length is 113 centimetres.

An excellent climber of trees and rock faces, it usually moves stealthily, feeding on birds, bats and geckos and entering small cracks in the rock to take sleeping diurnal lizards. It actively hunts even on cold winter nights when its movements are very slow. It is rear-fanged and the effects of the venom on man are not recorded, but it is believed to be only very mildly poisonous. It is not aggressive and does not generally strike, even when provoked.

VIPERS (FAMILY VIPERIDAE)

The vipers are a major group of venomous snakes, represented in the UAE by four species. Vipers have a pair of shortened maxilla bones, each of which has a single, long hollow fang. There are usually one or more replacement fangs on each side which move into the functional position as fangs are broken or shed.

The maxillae are hinged so that the fangs are automatically raised when the mouth is opened. When the mouth is shut, the fangs are folded flat against the roof of the mouth and enveloped in membranous sheaths. Venom glands typically are large, and the principal action of the venom is haemotoxic.

Viper bites are rarely fatal in Arabia. In exceptional cases where death has occurred, this has resulted from inappropriate or delayed medical intervention. The recommended first aid advice is to reassure the patient, immobilise the bite site (usually a leg or arm) with a firmly applied bandage and splint, and take the victim to the nearest hospital. Do NOT cut or suck the wound, apply a tourniquet, or give aspirin or spirits. Attempting to kill the snake is not recommended as this may result in further injury. Vipers, striking defensively, often do not inject venom.

In all UAE species, the upper side of the head is covered with small, overlapping scales, and the pupil contracts to a vertical slit in bright light. UAE vipers are crepuscular or nocturnal. Heavier-bodied than the other snake families, vipers rely on various ambush techniques and a lightning-fast strike to catch prey. Once envenomed, the prey is usually released to die, the viper then following the scent trail to its meal.

The nominate form of the Arabian horned viper *Cerastes gasperettii gasperettii*, is found throughout the sandy deserts of Arabia from the eastern edge of the Sinai Peninsula, and also north-eastwards to Iraq and western Iran (Werner *et al.* 1999). In the UAE they are common throughout the sandy areas, though their distinctive side-winding tracks are more often seen than the animals themselves. They are easily identified. The head is flat



The Arabian horned viper *Cerastes gasperettii gasperettii* has a distinctive pattern of scales (shown in detail in the top photograph) and leaves its characteristic side-winding tracks in the sand.

and wide, and in some individuals bears a pair of 'horns' made up of single, enlarged scales above the eyes. The sand-coloured body is flattened and stout, with a short tail. The dorsal scales have obvious anchor- or club-shaped keels, and the keeled lateral scales are arranged in oblique rows and can be rubbed together to produce a loud rasping warning.

Horned vipers are mainly nocturnal, but may bask on winter days. They feed on rodents, lizards and birds, using both an ambush strategy and active foraging, sometimes covering more than a kilometre in a single night.

Two species of saw-scaled vipers are found in the UAE. The Sind saw-scaled viper *Echis carinatus sochureki* has a distribution from Bangladesh across northern India to Pakistan and into eastern Arabia, where it is only found in the northern UAE and northern Oman. Other related species and subspecies are known from southern and central Asia, western Arabia and across Africa. The classification of these snakes is still uncertain. The maximum recorded length is 61 centimetres, but most are much smaller. Notwithstanding its small size, this is a dangerous snake with powerful venom. It strikes rapidly and continuously with minimal provocation.

The Sind saw-scaled viper has a more oval head than the other viper species, and usually bears a prominent dark-brown arrow-shaped marking. When threatened, it forms a series of C-shaped coils which are rubbed against each other in opposite directions, producing a loud rasping warning hiss which is amplified by the inflated body. It may move forward or back during this threat. The preferred habitat is sand or sandy gravel plains, including areas of cultivation. In the UAE it is only recorded in the northern lowlands, as far south as Abu Dhabi.

The Oman saw-scaled viper *Echis omanensis* was only recognized as a separate species within the *Echis coloratus* complex in 2004 by Babocsay. It is restricted to the UAE and northern Oman. It is often larger (maximum 75 centimetres total length) and more heavily built than the Sind saw-scaled viper, and is usually a dark brown or grey colour overall with the top of the head being unmarked. The colour pattern has less contrast, with the pale dorsal markings being tan or grey rather than whitish. The head is strongly widened behind the eyes, especially in larger individuals. There are usually three rows of scales separating the eyes from the labials, whereas *Echis carinatus* has two. The two species also occupy different habitats, with *omanensis* favouring rocky mountain wadis and hillsides. They are especially common in wadis with frequent or permanent water pools, where they feed on toads (Gillett 1994). A case study of a human casualty

TOP: Sind saw-scaled viper *Echis carinatus sochureki*

CENTRE: Scales of *E. carinatus sochureki*

RIGHT: Persian horned viper *Pseudocerastes persicus persicus*



suffering a non-fatal bite, probably of this species, is described by Wernery and Lipp (1998).

The fourth viper species, the Persian horned viper *Pseudocerastes persicus persicus*, is widespread in Iraq, Iran and Pakistan. In Arabia it is restricted to higher altitudes (usually above 1,000 metres) in the northern Oman mountains from Musandam to Jebel Qahwan in the Eastern Hajar. It has recently been reported in the UAE from Jebel Hafit and the Ru'us al-Jibal (Cunningham 2002a). Confined to the mountains, this species is a relict of a cooler and moister climate. It is terrestrial, but will sometimes climb into small bushes. When angry, it inflates the body and hisses loudly, but does not form writhing C-shaped coils as do the other three UAE vipers. It is a medium-sized, thick bodied snake, with prominent multiscaled 'horns' above the eyes.

In addition to the naturally occurring species, various introduced species may be encountered. The pet shops in the cities carry a range of exotic reptiles including tortoises, terrapins, crocodylians, lizards and snakes, and these may escape or be deliberately released. While the harsh desert conditions ensure that most species are unlikely to survive for long, some may be able to establish viable

populations. The Caspian terrapin *Mauremys caspica* has been reported in Wadi Shih (Gross 1996) and the ubiquitous American red eared sliders *Trachemys scripta* may now occur in permanent pools and ponds.

There have also been reports of crocodiles living in irrigation ditches near Dhaid while a dead crocodile was washed up in early 2003 at Jazirat al-Hamra, Ra's al-Khaimah.

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