



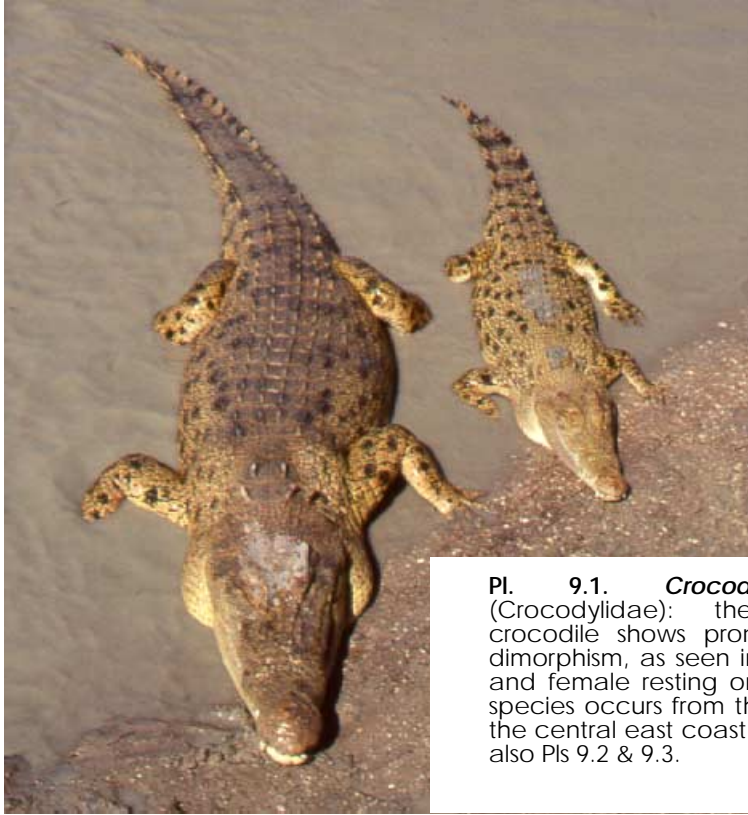
FAUNA *of* AUSTRALIA



39. GENERAL DESCRIPTION AND DEFINITION OF THE ORDER CROCODYLIA

Harold G. Cogger

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Pl. 9.1. *Crocodylus porosus* (Crocodylidae): the salt water crocodile shows pronounced sexual dimorphism, as seen in this male (left) and female resting on the shore; this species occurs from the Kimberleys to the central east coast of Australia; see also Pls 9.2 & 9.3. [G. Grigg]



Pl. 9.2. *Crocodylus porosus* (Crocodylidae): when feeding in the water, this species lifts the tail to counter balance the head; see also Pls 9.1 & 9.3. [G. Grigg]



Pl. 9.3. *Crocodylus porosus* (Crocodylidae): the snout is broad and rounded, the teeth (well-worn in this old animal) are set in an irregular row, and a palatal flap closes the entrance to the throat; see also Pls 9.1 & 9.2. [G. Grigg]



Pl. 9.4. *Crocodylus johnstoni* (Crocodylidae): the freshwater crocodile is found in rivers and billabongs from the Kimberleys to eastern Cape York; see also Pls 9.5–9.7. [G.J.W. Webb]



Pl. 9.5. *Crocodylus johnstoni* (Crocodylidae): the freshwater crocodile increases its apparent size by inflating its body when in a threat display; see also Pls 9.4, 9.6 & 9.7. [G.J.W. Webb]



Pl. 9.6. *Crocodylus johnstoni* (Crocodylidae): the freshwater crocodile has a long, slender snout, with a regular row of nearly equal sized teeth; the eyes and slit-like ears, set high on the head, can be closed during diving; see also Pls 9.4, 9.5 & 9.7. [G.J.W. Webb]



Pl. 9.7. *Crocodylus johnstoni* (Crocodylidae): the eyes and the slit-like ears are set high on the head, and can be closed during diving; see also Pls 9.4–9.6. [G. Grigg]

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Crocodylians, and the birds with which they share a common ancestor, represent the only extant members of the diapsid subclass Archosauromorpha. They represent an ancient conservative lineage which first evolved in the Triassic, about 215 million years ago. This group is characterised by the presence of a cranial pneumatic system in the snout, in the form of the antorbital fenestrae (Carroll 1988a).

Among living reptiles, the crocodylians are so distinctive in external appearance and behaviour that they cannot be confused by even the most inexperienced observer with representatives of any other reptilian groups (Pl. 9). All are large, semi-aquatic predators. They are usually protected by thick scaly skins under which are numerous large and small osteoderms. The tail is a long, powerful organ of locomotion and the skull is elongate and heavily built.

In modern crocodylians the palatine and pterygoid bones have extended laterally to form a full secondary palate, separating the mouth from the air passages above. This structural feature is accompanied by a large, fleshy transverse valve at the base of the tongue which can seal off the open mouth from the respiratory passage; it allows a crocodylian to open its mouth underwater to feed, and prevents water from entering the air passages. Assisting this process are the valved external nostrils which can seal the air passages when the animal is under water. These nostrils are situated on a mound at the end of the snout, allowing a crocodylian to breathe with only the tip of the snout above the surface of the water. Similarly, the eyes are elevated above the flat surface of the head, so that watch can be kept for prey or predators while remaining almost entirely submerged.

While the structure of the soft anatomy of extinct crocodylians is virtually unknown, extant ones have a fully four-chambered heart in which oxygen-rich arterial and oxygen-depleted venous blood remain separate. However, they also have an aperture between the right and left ventricles (the foramen of Panizza) which allows them to shunt blood to that part of the body where it will be warmed or cooled, according to the body's need to raise or lower its core temperature. They also have a complete muscular septum dividing the visceral from the pectoral cavity, which is thought to increase respiratory efficiency by helping to ventilate the lungs, like the diaphragm of mammals.

All living crocodylians are quadrupedal, but as the limbs are able to lift the heavy body off the ground for only brief periods, crocodylians can generally move quickly on land only in short bursts. In water, they are propelled mostly by the oar-like actions of the muscular tail, and the limbs lie alongside the body, thereby reducing drag. When floating, the limbs are held out from the body and used as stabilisers. The relatively small forelimbs have five digits, while the larger hindlimbs have only four. In all modern crocodiles the teeth are peg-like and lie in deep sockets (thecodont condition). The teeth wear, and are lost and regularly replaced throughout life by newly-erupting teeth in the sockets. Some form of parental care of the nests, eggs and young appears to be the norm in modern crocodylians.

Currently six suborders are recognised. Five are entirely restricted to fossil forms and only one, the suborder Eusuchia, contains both fossil and extant forms (Steel 1973). Within this suborder extant species are assigned to one of three families: the Crocodylidae (crocodiles), the Alligatoridae (alligators and caimans) and the Gavialidae (gharials). Of these, the crocodylids are pan-tropical, being found in all of the world's tropical regions with large permanent lakes and rivers. With the exception of a single species in China, alligatorids are confined to the Americas. Gavialids are restricted to the Indian subcontinent; one species, the false gharial (*Tomistoma schlegeli*) of the Malay Peninsula, has been transferred recently from the Crocodylidae to this family on the basis of biochemical evidence (Gatesy & Amato 1992).

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These three families are distinguished mainly on the shape of the skull and the arrangements of skeletal elements at the front of the skull. These, in turn, mainly reflect the shape of the head in the species of the three families.

Crocodylids have an elongated head in which the snout is relatively long and slender, tapering from the broader hind region of the skull. Alligatorids have a blunter, less tapering snout, while that of gavialids is very long and slender, more or less round in section, and strongly demarcated from the hind region of the skull.

Australia has two native crocodylians, both of which belong to the genus *Crocodylus* of the family Crocodylidae. Characteristic of this genus is the notch or perforation in the maxilla to receive the first mandibular tooth (Pl. 9.3, 9.6), and the lack of contact between the prefrontal bone and the maxilla, and between the fronto-parietal suture and the supratemporal fenestra. Typically there are five premaxillary teeth, 16 to 19 maxillary, and 14 to 15 mandibular, teeth on each side. The fifth maxillary tooth on each side is enlarged and caniniform.