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TORTOISES Z163A



A tortoise is a reptile. That is to say, tortoises are creatures who belong to the group of land-dwelling animals which lay eggs and have a body temperature which is dependent on their surrounding environment.

Like their aquatic cousins the turtles, tortoises are shielded from predators by a shell. The top part of the shell is called the carapace and the underside is called the plastron. Tortoises can vary in size from a few centimetres to two meters. Most land tortoises are herbivorous.

Tortoises are able to pull themselves into the protection of their carapace by emptying their lungs of air. They have a high tolerance of carbon dioxide in their blood so that, unlike human beings, they can hold their breath for a considerable period!

Because they need an external heat source tortoises tend to be active during daylight, though some species have tendencies to become active at dusk, depending on the ambient temperature. They are generally reclusive and shy.

Female tortoises lay about a dozen eggs in burrows or holes that they dig. Hatchlings take approximately 90 to 120 days to incubate from ping-pong-ball sized eggs. The hatchlings break out of their shells with their front beaks. Most are born with an embryonic egg sac, which serves as a source of food for the first couple of days. They are capable of eating solid food within 3 to 7 days.

Tortoises generally have lifespans comparable with those of human beings and some individuals are known to have lived longer than 150 years. The oldest tortoise ever recorded, indeed the oldest individual animal ever recorded, was a tortoise called Tui Malila, who was presented to the Tongan Royal Family by the British explorer Captain Cook shortly after its birth in 1777. Tui Malila remained in the care of the Tongan Royal Family until its death by natural causes on 19 May 1965, by which date it was 188 years old.

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Above: Four tortoise species. Clockwise from left, Testudo graeca ibera, Testudo hermanni boettgeri, Testudo hermanni hermanni, and Testudo marginata sarda.

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There are four species of tortoise native to southern Europe - the Greek Tortoise (*Testudo graeca*), Hermann's Tortoise (*Testudo hermanni*), the Marginated Tortoise (*Testudo marginata*) and Horsfield's Tortoise (*Testudo horsfieldii*). However, the division of tortoises into species, sub-species and varieties is often controversial. Developments in genetic analysis have also complicated matters further, suggesting in some cases that what had been thought to be a single species should be split into several unrelated species.

The examples in this box have not been securely identified. Identification using a carapace alone is unreliable as many species markers are found on other parts of the body, the tail or legs for example. It is not known how old each animal was when it died, or where the specimen was collected from. The identification of the carapaces in this box is, therefore, provisional.

Large Tortoise Carapace





This carapace has the oblong shape that is characteristic of the Greek tortoise *(Testudo graeca)*, although it is larger than most sub-species in this family. Greek tortoises are not, despite the name, confined to Greece and its immediate area. They can be found in Bulgaria, Armenia, Libya, Morocco, Sardinia - all around the eastern and southern Mediterranean and stretching eastwards into Asia. The various terrains and climates that they inhabit have produced a huge number of varieties, with new subspecies constantly being suggested. There are currently at least twenty published subspecies and biologists are still not sure how to catagorise many of the tortoises that live in this region.

If this carapace is a member of the 'Greek' family, then its dark colouration suggests it may be from one of the colder regions in the area. A black coloured carapace is helpful for survival in regions which are cold in winter as it allows the tortoise to absorb a great deal of heat in a short time, enabling it to maintain its body temperature. Tortoises from extremely hot places like parts of Egypt and Morocco tend to be lighter in colour, thus reflecting some of the searing heat. Tortoises in Turkey, for example, where winter conditions can be harsh, have a shorter period available for breeding than do tortoises in north Africa and they tend to be darker than African tortoises in order to maintain activity for as long as possible.

Above: A Testudo graeca species.

Small Tortoise Carapace



This is probably the carapace and plastron (lower shell) from a Hermann's tortoise (*Testudo hermanni*), of which there are two sub-species. The photographs on the right show an upper and lower view of one of these, *Testudo hermanni boettgeri*, for comparison. One of the distinguishing features of *Testudo hermanni* are the two dark bands which run along the plastron, which are clearly present on this example.





Testudo hermanni can be found throughout southern Europe. The western subspecies (*T. hermanni hermanni*) is found in eastern Spain, southern France, the Balearic islands, Corsica, Sardinia, and central Italy (Tuscany). The eastern subspecies (*T. hermanni boettgeri*) is found in Croatia, Macedonia, Romania, Bulgaria, Albania, and Greece. The eastern subspecies is much larger than the western, reaching sizes up to 28 cm (11 inches) in length. A specimen of this size may weigh 3-4 kg (6-9 lb). *Testudo hermanni hermanni* rarely grow larger than 18 cm (7.5 inches). Some adult specimens are as small as 7 cm (3 inches).

At night they sleep in hollows under bushes, emerging in the morning to bask in the sun and warm their bodies. They then roam about in search of food. They determine which plants to eat by the sense of smell. In addition to leaves and flowers, the animals eat fruits as supplementary nutrition. As a small amount of animal protein is necessary as well they usually eat worms or snails to satisfy this need. Around midday, the sun becomes too hot for them, so they return to their hiding places. They have a good sense of direction and experiments have shown that they also possess a good sense of time. In the late afternoon they leave their shelters again and return to feeding.

Star-Pattern Carapace



This is probably from an Indian star tortoise (*Geochelone elegans,* see photograph right) which can be found in dry areas and scrub forest in India and Sri Lanka. The striking patterning on the carapace means this species is quite popular in the pet trade. In the wild the star patterning breaks the outline of the tortoise as it sits in the shade of grass or vegetation.

Star tortoises are mostly herbivorous and feed on grasses, fallen fruit, flowers and leaves of succulent plants, and will occasionally eat carrion. Females are considerably larger than their male counterparts. In addition, the female's plastron is much flatter than that of the males which has a concave shape.

Tortoise Egg



Actually, this is a turtle egg - but it has a very similar appearance to that of a tortoise!

Breeding behaviour is fairly similar across species. The marginated tortoise (*Testudo marginata*), for example, the largest European species, digs a hole in which to lay eggs. The depth of the hole is determined by the length of the female's hind legs. If the ground is too hard to dig, the female releases water from her anal gland to soften it.

Once the hole is dug egg laying begins. Each egg is gently rolled back into the hole. After the last egg the female immediately begins refilling the hole, again using her hind legs. Finally, she stamps the opening closed with her feet so that the ground regains its natural hardness. Larger animals may lay eggs as many as three times a summer, with about 15 eggs in each clutch.

The incubation period averages about 100 days under natural conditions, which is relatively short among tortoises. Many tropical tortoises have incubation periods of up to 200 days. The relatively short time is an adaptation to the subtropical Mediterranean climate, where the summers are not as long.

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After the embryo has fully developed in the egg, the young animal breaks the shell with its egg tooth from inside, creates a small opening, and for the first time fill its lungs with air. Afterwards, it pulls back into the egg and works on the shell with its beak until it opens completely. In nature, the animal remains below ground for the first two weeks. Here it is safe from predators yet is still able to grow, as it is nourished by the yolk sac. The young animals lead cautious and secretive lives, normally remaining in the shade. They avoid full sunlight because of the danger of overheating.



Left: A marginated tortoise emerging from its egg.



Right: A newly hatched marginated tortoise - note the yolk sac.