

Keeping and breeding the Marginated Tortoise, *Testudo marginata*, in the UK

The Marginated Tortoise has never been a particularly commonly kept tortoise in the UK, mainly due to the lack of availability. Marginateds were never commonly imported in the past and have only recently become more available due to captive breeding in the UK, and more commonly on the continent.

DESCRIPTION

The Marginated Tortoise is one of the largest of the Mediterranean tortoises, only matched in weight and size by some of the larger sub species of Spur Thigh Tortoise *Testudo graeca whitei* found throughout Algeria.

Marginated tortoises are very distinctive animals and are easily distinguished from other Mediterranean species. Adult Marginateds have a rather elongated carapace with extremely flared posterior marginal scutes. An extremely simple way to identify a marginated tortoise however is to turn one upside down and check out the plastron, as this species possesses 3 or 4 pairs of chocolate brown coloured triangular markings on each of the large scutes. The only other species to have this is the Egyptian tortoise *Testudo kienmanni*.

Adult marginated tortoises are usually uniform black to dark grey across the carapace, with a cream coloured skin which becomes darker towards the head and legs. They typically weigh around 2-3 kg although larger individuals are regularly encountered.

Males and females are very similar in size although females generally weigh more. This is primarily due to the fact that males have a more pinched in sides, giving them a kind of peanut shape when viewed from above. Males also have a very concave plastron aiding them when mounting the female during mating. Females have a rather flat plastron and are quite broad across the carapace. They are also an overall oval shape when viewed from above.

Male marginated tortoises also have a much longer tail than the females.

Hatchlings and juveniles are very attractively marked sporting a cream to beige background colour with chocolate to black triangular markings across the carapace. They generally have little or no markings on the marginal scutes creating a pale cream coloured skirt around the tortoise. The skin of juveniles is very soft and again cream coloured although the head and front legs are somewhat darker.

DISTRIBUTION

The nominate species *Testudo marginata marginata* naturally occurs throughout Southern Greece, from the Peloponnese to Mount Olympus. They are also found in fragmented populations in Italy and Sardinia, but these are believed to have been introduced by ancient people. There is currently one recognised sub species *Testudo marginata weissingeri*, which is a smaller paler coloured tortoise found around the south western coast of the Peloponnese. The Sardinian race is referred to as *Testudo marginata sarda* and is said to have a smoother edge to the marginal scutes.

ACCOMMODATION

The marginated tortoise is particularly hardy and with the correct care can live a very long time in captivity. This species will do well with access to a spacious outdoor pen throughout the summer months. They are extremely tolerant of our climate.

A small colony of marginated tortoises can be maintained in a large enclosure with access to an indoor green house, approx. 2m x 3m, which should be positioned in full sun with access to mercury vapour heat lamps for cooler days. The greenhouse should be well furnished to create an interesting environment. Provide several upturned logs for hiding and shade, also place some hardy plants around to create areas of interest. There should be at least two areas created out of soft sand and soil positioned in full sun as nesting sites for the female inhabitants. Nest mounds should be regularly watered and should be at least as deep as the largest female is long.

The indoor greenhouse enclosure should be open to a large paddock area at least 6 to 10 metres square. This paddock area again should be in full sun, although shade should always be provided. Try to create as variable a habitat as possible providing both rocky areas to climb and sunbathe on, and areas to graze.

Each year the habitat should be seeded with edible native weeds and grasses which the inhabitants can freely graze. It is vitally important to provide as interesting an environment as possible to keep these animals happy. Small shrubs which produce edible flowers such as hardy hibiscus and lavatera can be grown around the enclosure to provide shade and additional edible flowers throughout the summer. Large chunks of raw chalk lumps should be placed throughout the enclosure to provide additional calcium when the tortoises need it.

The perimeter should be of a solid construction and should be at least as tall as twice the length of the largest tortoise.

Hatchlings and juveniles should be kept in an indoor tortoise table type set up. A large plastic open topped container 1m x 0.5m x 0.5m high is ideal, this should have a 6 – 8cm deep substrate comprised of one part soft sand to one part loam based compost. The container can be heated with a 100w mercury vapour lamp creating a basking temp of around 30 – 35C, and also providing uvb light to aid healthy bone and shell development in the hatchlings. Air temps. should remain around 18 – 24C, humidity around 40-50% for the developing juveniles. It is very important to provide damp areas within the habitat for the youngsters to burrow into, creating a protective micro climate which prevents dehydration. Create an interesting environment with up turned logs and flat surfaces to feed off and always provide a shallow water bowl for soaking and drinking, this should be refreshed at least daily. Youngsters should be allowed as much access as possible to outdoors, weather permitting; there is no real substitute for natural sunlight and natural grazing opportunities.

FEEDING

Marginated tortoises are strictly herbivorous and require a high fibre, high calcium, low protein, low sugar diet to remain in good health. Predominantly their diet should be made up of native edible weeds and flowers with access to grasses for fibre. These tortoises require lots of fibre in their diet and are the most likely of the *Testudo* species to regularly graze on fresh grass within a lawn. Dandelion, plantain, clover, buttercup, mallow, hawkbits, goose grass, dead nettle and borage can make up the bulk of their diet. This should be collected from pesticide free areas, washed and mixed with a good quality calcium D3 supplement such as vet ark nutrobal. I would recommend feeding adults three to four times per week allowing them to graze their own food on the other days. Some salad greens such as lettuce and watercress can also be offered, but this should remain in moderation. Flowers can be offered during their seasons which will be relished by these tortoises. Calcium should be in regular supply as these animals require a lot to remain healthy. Water should always be available in large shallow trays to allow soaking, Marginateds are great drinkers and love to soak in warm water during hot days. Refresh water bowls at least daily.

Fruit should never be fed to this species as it causes digestive upset and may contribute to intestinal worms and flagellates. Never feed cat or dog food to this species, excessive protein diets will severely damage the kidneys and will cause an over growth of the shell which will be fatal.

Juveniles should be fed a similar diet to the adults only feed as much as can be eaten within one hour per day. Always provide a good calcium/vit D3 supplement with each meal. Dry leaves and chopped hay should always be available to provide extra fibre.

BREEDING

Marginated tortoises are remarkably simple to breed in captivity and given the right conditions they can also be very productive.

Male marginates are quite sexually aggressive animals and often have to be removed from the females from time to time to give the females a break. Mating behaviour is therefore regularly seen throughout the year, especially so directly after hibernation. Mating usually begins with the male following the female around before he begins to ram the back of her carapace with his gular scutes. He may also bite at her back legs in an attempt to slow her down. If she accepts his advances and stands still he will mount her. During mating he will rock her from side to side and emit a high pitched squeaking sound.

Females usually start laying eggs from late April through to late June, these are quite productive tortoises and females regularly lay three clutches per year. Average clutches are around 8 - 10, although larger

females can lay up to 15 in a clutch. Females lay eggs in the usual *Testudo* manner, digging out a jug shaped nest with their back legs in which to deposit their eggs. They can be particularly fussy about where they lay their eggs and also can be very secretive nesters, covering their tracks very well. Keepers should watch their charges very closely during the egg-laying season, to prevent missing nests and losing eggs. Marginated eggs are pretty small in size compared to other *Testudo* species and typically measure between 28-30mm in length.

The eggs should be placed in an incubator at 30C with a humidity of around 40-50%, incubation usually takes between 65 and 70 days. Hatching can be a slow process and may take over 24 hours from when the egg starts to pip. Do not attempt to help the youngsters out, simply raise the humidity a little if you are concerned. Hatchlings are small, measuring around 25-30mm. They should be placed in clean containers on a deep layer of damp tissue paper kept within the incubator for 24hrs or so, to absorb their yolk sac and straighten out, after which they can be placed within the juvenile quarters.

HIBERNATION

Hibernation is a natural part of the marginated tortoises' biology and these animals would hibernate each year for approx. 2 – 3 months each winter. Hibernation is essential if you want to regularly breed this species.

Hibernation must be controlled from start to finish to make it safe for the tortoises. I prefer to hibernate my tortoises within the confines of a fridge so as to control the temperature throughout.

The tortoises will require a fasting period prior to hibernation to ensure that their gut is free from food which could begin to rot as the temperature drops and the animals digestive action stops. Adult tortoises may take up to 3 weeks to be fully cleared of food and during this time it is essential to soak the tortoises several times per week, if not daily. This ensures that the animals are fully hydrated and have flushed out their bladders ready for hibernation. I usually start fasting my tortoises at around the middle to the end of November. I shorten the day length offered to the tortoises by a couple of hours per day per week of the fast and once I'm sure the tortoises have fully fasted I turn the lamps off completely and allow the animals to cool below 10C. Med tortoises should preferably hibernate at about 5 – 6C. At 5C these animals seldom lose more than 1% of their body weight per month in hibernation. Tortoises should be protected from freezing during the hibernation period and digital thermometers should be placed in and around the fridge to monitor temperatures daily. Many tortoises die each year during hibernation when temperatures are not properly checked and animals are allowed to freeze, especially in the past two very cold winters we've just experienced!!

Tortoises should not be hibernated for more than 10 to 12 weeks at a time and their weight should be checked prior to, during and after hibernation. It is a myth to believe that hibernating tortoises can't be disturbed throughout hibernation. As long as you handle them carefully and do not warm them up, no harm will come to them.

If you choose to use the fridge method then ventilation is very important, make sure the fridge is opened a couple of times a week, alternatively a few small holes can be cut in the seal of the door to allow air circulation.

Hibernation is typically controlled by temperature and as long as the temps remain cold (5C) the tortoises will remain dormant. To wake the tortoises up at the other end of hibernation simply raise the temperature above 10C and the animals will awaken. I prefer to move the tortoises from their fridge hibernaculum to a warm room in the house where they can slowly come round. Once they have opened their eyes and started to stir I then move them into their winter quarters with access to UVB heat lamps with basking temperatures of around 30 – 35C. Air temps can drop down to 15C or so during the evenings but shouldn't drop further at this time. Healthy tortoises will usually begin feeding within 24 hours of waking up.

Try to get the tortoises back outdoors as soon as the weather begins to warm up, even if it is just out during the day and back in at night.

Status in the wild

Marginated tortoises are currently protected on CITES 11 internationally and on ANNEX A of the European Union. This means that if you want to buy a Marginated Tortoise, or breed and sell the youngsters, you must have or obtain an article 10 certificate per animal from DEFRA before you do so.

They are on the IUCN'S red list and are currently considered vulnerable throughout their range. This is mainly due to habitat loss and modern agricultural methods. Many are still kept as pets throughout their natural range.