



EDWARD LABAYZOO ATLANTA

The Impressed Tortoise (*Manouria impressa*) is listed as “vulnerable” on the IUCN Red List.

## H U S B A N D R Y

## Keeping and Breeding Impressed Tortoises (*Manouria impressa*)

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Photographs by the author, except where noted.

The Impressed Tortoise (*Manouria impressa*) of southeastern Asia is a specialized animal that can do quite well in captivity if its needs are understood and met. These rare tortoises come from high mountain forests in Vietnam, Cambodia, Thailand, Laos, Burma, southern China, and Malaysia. They prefer dense evergreen and bamboo forests at elevations above 700 m. These areas receive daily rainfall, and the forest floor remains moist even in the dryer months. Humidity is 70–100% and rarely drops below 65%. Tortoises typically are found hiding under fallen trees, bamboo tubes, or buried in leaf litter. In open areas, they will always stay hidden. Temperatures in suitable habitat usually are 21–27 °C (70–80 °F) during the day, with lows of 10–18 °C (50–64 °F) at night. These conditions, along with the dense canopy, are perfect for their

primary food source, mushrooms. These fungivores will consume some low-lying vegetation, but feed mainly on the wide variety of mushrooms that grow in these damp montane forests. Some reports indicate that they will feed on bamboo shoots, although this has not been observed in captive animals. These tortoises prefer not to bask in open sun, but stay close to tree roots and cover. They are not known to soak in the wild unless temperatures are extremely high. However, captive specimens regularly soak in shallow pools and water sources.

When preparing an artificial habitat for Impressed Tortoises, first determine if outdoor pens are an option. If weather conditions allow, this is always the preferred method. Large pens with heavily planted hills are best suited. Be sure to add as much leaf litter as possible, as



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The Impressed Tortoise (*Manouria impressa*) comes from southeastern Asian montane forests, where the weather is warm and rainy most of the year.



Impressed Tortoises spend most of their time settled into leaf litter. This individual has burrowed under the layers of leaves with only its head exposed.

Impressed Tortoises build large nests during the breeding season. In one collection, a 1.3 adult breeding group is housed in a space covering more than 90 m<sup>2</sup> (300 ft<sup>2</sup>), with several large trees to allow for plenty of shade. A 1.1 adult pair should have at least 45 m<sup>2</sup> of space. Lots of bamboo trees or other canopy coverage should be provided, and leaf litter should be added several times during the year.

Avoiding dehydration, which contributes to a lack of appetite and other health issues, is critically important, so daily misting is definitely recommended. If possible, use misting heads placed at 1.5-m intervals around the perimeter of the enclosure. At least twice a week, a sprinkler can be used for heavy soaking of plants and leaf litter, but be sure to mist the habitat daily for about one hour.

If temperatures drop below 10 °C (50 °F) at night, the tortoises must be housed inside. Be sure to provide ultraviolet light with a quality UV-bulb during the day. *Manouria impressa* is best housed individually when inside, as this will help reduce stress on animals kept in close contact. Enclosures can have mulch or moistened sphagnum substrate with leaf litter to allow the animals to bury, and should be at least 2.25 m<sup>2</sup> for an average adult. Spray the enclosure daily and provide regular soakings every other day. The best method for this is a fine mist for about an hour in a box with drainage. Usually, when this is offered, Impressed Tortoises will start drinking



*Manouria impressa* can be fed a salad of mixed greens, vegetables, and mushrooms twice a week.



Large enclosures should be planted with heavy vegetation for ample shade. Leaf litter can be added to allow for nest building and hiding behavior. Shallow ponds are a good idea for captive animals.

immediately. They are rarely observed drinking from water bowls, although a shallow dish with clean water should be provided.

*Manouria impressa* can be fed a salad twice a week, but be sure to mix greens and vegetables with their primary diet of mushrooms. Captive animals seem to like a variety of greens such as bok choy and collard greens, along with yellow squash, zucchini, sweet potato, and carrots. Oyster Mushrooms seem to be well accepted and have a high calcium content, making them an excellent captive diet, especially for breeding females. Some stubborn feeders have shown an interest in fruits, flowers, and even prepared pellet foods. They can be offered mushrooms as browse once or twice a week between regular feedings.

Breeding groups can be maintained well in captivity and babies grow quickly with proper conditions. Mating usually occurs in early spring and will continue all summer. Eggs are generally laid in June and July. Females build large nests by walking around in increasingly larger circles, pulling together the leaf litter to form a tightly woven pile. This usually is done next to a wall or fence, and the finished pile will be up to 1 m high. The female will clear out a center hole about 30–35 cm deep and deposit 10–20 eggs. She will then cover them using the same method of circling to collect leaves, pulling any vegetation together to insulate the eggs.



Oyster Mushrooms are a great source of calcium and are readily accepted by captive Impressed Tortoises.

The eggs can be removed from the nest and placed in moistened vermiculite at a 1:1 weight ratio with water. The species is subject to temperature-dependant sex determination (TSD), with females incubated at 28.8–30.0 °C (84–86 °F) and males at 26.6 °C (80 °F). At these temperatures, they will hatch in 64–79 days. Babies should be housed in moistened sphagnum moss with leaf litter and a small hide. A shallow water dish should be provided to allow for soaking, which babies do quite often in captivity, although rarely in the wild.

Young tortoises should continue to gain weight weekly if housed in small groups of two or three. Watch for any weight loss, as this is usually a sign of crowded conditions indicating that these animals might need to be separated. Once separated, smaller individuals will typically continue to grow. Babies should be fed a finely chopped version of the adult diet. Misting of babies when offering food might encourage problem feeders. Impressed Tortoises also have been observed feeding on pelleted diets, such as Mazuri Tortoise Chow. When moistened with water, pellets can be added to the chopped diet. This combination has produced higher growth rates than a diet without pellets in at least two individuals in captivity. As for adults, regular misting is extremely important.

Reptilian health issues are difficult to detect and even more difficult to treat. Impressed Tortoises can suffer from many of the same ailments that affect other species. Most of these problems occur when transitioning from outdoor to indoor enclosures for winter. This would point to stress as a strong catalyst for disease. Most commonly, adult tortoises have issues with internal parasites, such as amoebas. Progression can be rapid after initial signs, such as lethargy and weight loss, are observed. Proper diagnosis and treatment must be prompt, as these animals usually hide in leaf litter and weight loss may not be detected quickly. Accurate records and regular weighing are necessary to catch these issues early.

Individually housing adults during the non-breeding season is the best way to avoid undue stress. A common problem in imported adults is the presence of gastric foreign bodies. Some adults that came into the United States from southeastern Asia were obtained from the food trade, where they often consume rocks and other non-digestible objects while provided with inadequate care. In several animals, surgery was performed and rocks were removed. They were treated with pain medications, given antibiotics, and regular fluids. All had to be tube-fed a liquid diet for several weeks until they began to eat. Two of the animals on which operations had been conducted began to breed the following year.

With proper understanding and care, these amazing and rare tortoises can be wonderful fixtures in a collection. Impressed Tortoises require specialized food and habitat conditions to flourish — or even survive. Their care is demanding but the rewards are great. With continued research, we can learn more about these animals and become increasingly successful with captive breeding. They are currently listed as vulnerable on the IUCN Red List, but with help from captive breeding and continued conservation efforts, their status could be improved.



Tortoises build large nests (to 1m high) using leaf litter.



Eggs are buried as deep as 35 cm to maintain proper temperatures. Wet leaves are woven tightly to secure the nest.



Hard-shelled eggs are typically the size of ping-pong balls. This species is subject to temperature-dependant sex determination (TSD).