



The Herpetoculture of *Indotestudo forstenii*

Michaela H. Wiersema

A large adult female *Indotestudo forstenii*. Photo by Anthony Pierlioni.

One of the most overlooked species in the world of chelonian conservation is *Indotestudo forstenii*. Frequently referred to as Forsten's Tortoise, the Asian Turtle Trade Working Group classifies the species as 'endangered' and it is an Appendix II species in CITES. According to Rhodin et al (2017), the species occurs on Sulawesi and possibly the nearby island of Halmahera (The labeled type specimen is labeled "Gilolo...Indischen Archipel" (Halmahera, Moluccas, Indonesia) but this is probably an error).

An eye-catching tortoise and desperately in need of conservation, *I. forstenii* has captured the interest of not nearly enough dedicated conservationists. Until the year 2000, this species was synonymous with *I. travancorica*, but the realization "that *I. forstenii* was indeed a distinct species" resulted from Dr. Peter Pritchard's extensive research (Senneke and Tabaka). Based on the fact that they are listed on CITES Appendix II, tracking data reveals that the volume of exports varied greatly between 1985 and 2004, before diminish-

ing drastically in 2004 (Ives, 2006). The Asian turtle trade has levied a heavy toll on the wild population of these endangered tortoises, and threatens to push them to the status of functionally extinct. Forsten's Tortoise is heavily collected for the food markets in conjunction with medicinal purposes; simultaneously, it remains highly desirable for the pet trade (Platt, 2006). Solely the unfaltering work of passionate turtle breeders and conservationists possess the capability of preserving these chelonians which are vanishing in nature at an alarming rate.

Indotestudo forstenii exhibits numerous desirable traits which accommodate turtle breeders with incentives to work with them. Their moderate straight carapace length of approximately 25 cm (10") reveals a beneficial husbandry aspect, creating ideal captives for the space-conscious keeper, considering they do not attain the size of the larger Elongated Tortoise, *I. elongata* (Senneke and Tabaka). Keepers who reside in harsh climates may consequently maintain this spe-

cies indoors. When reared from hatchlings, these chelonians are remarkably personable and the majority of neonates expectantly emerge for food when their keeper is near. Their intricate coloration and patterns are exceptionally eye-catching, markedly in juveniles; furthermore, they diversify in coloration until they achieve maturity, when each specimen attains an increasingly uniform appearance.

This species proves to be a rewarding captive; however, specific and precise husbandry procedures are obligatory to sustain the health of these chelonians. Although specimens prove relatively hardy when established correctly, imported animals are notably fragile and the fatality rate is frequently high. Consequently, captive-bred specimens are optimal, considering they are superior captives and breeders. Benjamin Forrest, a Conservation Husbandry Specialist for theTurtleRoom, reports that captive-bred females may produce increasing numbers of clutches yearly in comparison to wild-collected specimens. Due to their reputation for aggression, individual Forsten's Tortoises should ideally be housed separately except for breeding purposes. In addition, an enclosure measuring at least 90 cm by 150 cm (3 ft. by 5 ft) is the minimum for a single adult.

Indotestudo forstenii originates from two contrasting ecosystems according to Forrest, one of which is composed of a moist and humid rainforest environment, while the other emulates xeric terrain with drier conditions (Ives, 2006). The combination of humidity and well-drained substrate without accumulation of exorbitant moisture appears to be ideal for either "form". Neonates become susceptible to fungal infections if the substrate is unduly moist, and numerous hatchlings have perished due to improper or insufficient treatment. An ideal combination composed of 50% peat moss and 50% cypress mulch creates an optimal medium. Additionally, peat moss reduces the pH of



A new *Indotestudo forstenii* enclosure like this will need time for live plants like knockout rose and spirea to grow in and provide escape from aggression. Photo by Anthony Pierlioni.

the substrate and inhibits the formation of mold due to the increased acidity. These tropical tortoises appreciate a frequent rain shower and a gentle misting may coax out a timid specimen. *Indotestudo forstenii* is genuinely fond of water and a substantial water dish sufficient to accommodate the entire body is mandatory to promote health and well-being. Housing hatchlings with a water dish is not recommended. Instead, they should be soaked at least once daily in warm shallow water. Neonates are notorious for overturning in the most shallow of water and subsequently drowning themselves.



Even small tortoises can display aggression, including ramming like that displayed here.

Live plants and logs provide a naturalistic environment and increase humidity, as well as provide hides for these deep-forest dwellers. Tropical flora may be utilized for habitat design, including *Alocasia*, *Colocasia*, *Schefflera*, and *Philodendron* species. In addition, *Opuntia nigricans* is reported to flourish within their natural habitat (Ryanto, 2003). Hibiscus is a valuable augmentation to the landscaping, and the tortoises relish the blooms; moreover, *Musa* species are completely edible and tropical plants which make ideal options for keepers in warmer regions.

Under correct conditions, these tortoises thrive outdoors; however, if housed indoors, the enclosures should be equipped with a form of UVB lighting as occasional basking is savored, even though they are rainforest dwellers. A low-wattage bulb installed overhead provides sufficient UVB rays for them to synthesize Vitamin D3 correctly. Care must be taken in regards to the light intensity and individual tortoises should be monitored because stress resulting from intense lighting has been reported. This stress can cause detrimental effects quite quickly for these delicate animals, specifically for recently imported specimens. Mature *I. forstenii* may be maintained outdoors providing the night temperatures do not dip below the 65° F (18° C) and the days provide plentiful sunlight. Hatchlings should be housed indoors in a warmer environment which does not decline below 75° F (24° C), combined with a basking spot of 90° F (32° C) to stimulate proper metabolism.

The diet of *I. forstenii* is considerably variable. Unlike numerous tortoise species, this Asian tortoise naturally consumes fruit and animal protein in its native habitat (Platt, 2006). The staple diet in captivity should be composed of a variety of leafy greens such as dandelion, plantain, clover, turnip greens, collards, mulberry leaves, and Hibiscus leaves, to name a few. Hibiscus blooms may form a generous portion of the diet during the flowering season according to Forrest (Pers. comm., 2015). Fruit may be offered a couple times per week and the options are variable. Tropical fruit such as papaya, guava, and banana are greatly relished. Melons and berries are devoured.

The mission of the Turtle and Tortoise Preservation Group (TTPG) is to ensure survival of the world's turtles and tortoises through captive breeding. The TTPG supports the private ownership of chelonians and recognizes the substantial role that the private sector has played in the captive breeding and conservation of turtles and tortoises.



Captive-bred hatchlings are often available, but are less popular with buyers than wild-caught adults. Photo by Ben Forrest.

Vegetables including squashes, carrots, and sweet potatoes are likewise absolutely acceptable and lower in sugars. Animal protein should be offered sparingly. *Indotestudo forstenii* is stimulated to forage soon after a rain shower, and misting will frequently induce new animals to initiate feeding during the acclimation process. Calcium supplementation is highly recommended in the form of free-choice cuttlebone. The hatchling diet may be supplemented with an additional light sprinkling of calcium powder and a quality multivitamin on their salads once per week. It is recommended to supplement gravid females with additional calcium due to the fact that their bodies are utilizing calcium stores to form strong eggshells.

Indotestudo forstenii is an enjoyable species to keep and valuable for numerous conservation-related reasons, one of which being their amazingly limited range. Endemic to merely two Indonesian islands, these animals have nearly been overlooked by many conservationists as they focus their work on other Asian species which demand increasing attention. Although the continuing work with highly prominent species is exemplary and essential, equivalent emphasis is mandatory for *I. forstenii*. Their plight is magnified due to the fact that each female deposits a single or pair of eggs per clutch. Consequently, their wild populations are immensely vulnerable to predation in addition to harvesting, deforestation, and even natural disasters. This low reproductive rate thus creates a dangerous situation for the long-term viability of the wild population.

Currently, Forsten's Tortoises are expeditiously plunging down the path of extinction and addition-



Hatchlings and adults can display great variability. Photo by Ben Forrest.

al passionate turtle breeders and chelonian conservationists are obliged to drag them away from the brink. Increasing numbers of assurance colonies, both *in situ* and *ex situ*, need to be established, and the Global Action Plan for Conservation of Tortoises and Freshwater Turtles, which the Turtle Survival Alliance has implemented so successfully, is vital for their preservation. Furthermore, the efforts of private turtle breeders play a distinct role in the preservation of *I. forstenii*. Public education regarding the plight of these tortoises is essential, and the inhabitants of Asia desperately require instruction to promote awareness of the dire situation that the Asian Turtle Trade has caused for innumerable species, in addition to *I. forstenii*. If we can persuade the Asian government of the status and significance of chelonians and their ecosystem, we will aid in preserving the many thousands of animals which are bought and sold through the markets daily (Ives, 2006). The AZA Species Survival Plan Program implements a studbook program

as well as *in situ* conservation measures, and increasing studies should be performed on the trade and wild status of *I. forstenii* (Light, 2016). The goal remains to acquire increased data to preserve these animals from utter extinction.

I have made the conscious decision to dedicate my time and effort into preserving such a fragile tortoise, and the personal experience of working with these endangered and beautiful animals is a privilege and an honor. I feel the need to conserve Forsten's Tortoises due to the fact that they have not been granted the same amount of attention as many other species have been fortunate enough to receive. Their personalities and beauty capture my heart, and it is my dream that they will someday be rescued from the dire situation in which they find themselves.



A captive-bred *I. forstenii* peeks out at the world, while remaining hidden.

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- Michaela Wiersema is a staff member of the Turtle Room, which is a Conservation Partner of The Association of Zoos and Aquariums and is dedicated to the conservation of chelonians from around the world as well as promoting public education. She contributes as part of the World Turtle News team and has been working on several natural history and husbandry articles. She has a specific interest in Southeast Asian chelonians and her main passion lies with her growing group of *Indotestudo forstenii*. She also currently maintains a group of *Manouria emys emys* along with several species of *Terrapene*. She has worked directly with over 70 species of chelonians. Michaela is a veterinary technician near the border of Mexico and is pursuing a Veterinary Technician License.