

## EDITORIAL

### **A ray of hope in the darkness: What we have learned from Yangtze giant soft-shell turtle *Rafetus swinhoei* (Gray, 1873) conservation?**

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The Swinhoe's softshell turtle, *Rafetus swinhoei* (Gray, 1873), is one of the world's largest freshwater turtles, and possibly the most endangered turtle species on the planet (Stanford *et al.*, 2018). It has an overall length of over 100 cm and a width of up to 70 cm, and it can easily weigh up to 70–100 kg, maximum weight was recorded at 169 kg (Solimine, 2013; Trong, 2018). Despite its enormous size and unusual look, this species is incredibly secretive and only comes to the surface to breathe, preferring to remain submerged deep down. For this species, there is very little ecological information, and the remaining distribution is unclear. This could explain why it's so difficult to positively identify and confirm occurrences of this species in the wild (Trong, 2018). If we look back to the history and biogeography of this species, it can be found that the existential records were documented in the historical literature of the Chinese and Vietnamese dynasties. This species was once thought to only live along the Red River in China and Vietnam, as well as the lower Yangtze River floodplain in China, but its current population size is estimated to be just one wild individual of undetermined sex and a solitary captivity male in Suzhou Zoo, China. Although recent thorough searches in Yunnan, China, and Vietnam failed to confirm the presence of more wild specimens, some sightings were reported until around a decade ago (Stanford *et al.*, 2018), giving hope that more individuals may yet exist in Vietnam. It was already scarce when Pierre-Marie Heude collected some specimens from the Tai Hu Lake area in the 1870s (Heude, 1880). Most populations in China and Vietnam appear to be extinct after a long period of overexploitation (Le and Pritchard, 2009; Pritchard, 2001; Wang and Shi, 2011). The last reported wild specimen in China was captured and released in 1998 along the Red River between Yuanyang and Jianshui. Only three to four living specimens have been discovered: one or two at Dong Mo Lake Son Tay in Hanoi, Vietnam, one at Xuan Khanh Lake near Hanoi, Vietnam, (Mayer, 2018), and one at China's Suzhou Zoo. In 2016/17 Suzhou Zoo moved to a new location and the *R. swinhoei* pair were in a temporary

holding facility, a situation bringing new uncertainties to the conservation efforts. Suzhou Zoo's sole female turtle died on April 13, 2019, just following the most recent reproductive period (Al Jazeera, 2019). In total, 90% of the *Rafetus swinhoei* hunters believed that wild *R. swinhoei* individuals should still be present at their particular sites, and some hunters also reported a few recent sightings that they attributed to the target species (Pham Van *et al.*, 2020).

Now the greatest questions will repeatedly come, what and which situations will bring this species to the edge of the ditch of extinction? It is straightforward to answer the reasons behind the current situation of a threatened or near-extinct species nowadays. Eventually, some scientists and conservationists suggested that the destruction of their habitat by river regulation, dam construction and polluting rivers for critical species is a major potential threat (Solimine, 2013; Stanford *et al.*, 2018). On the other hand, hunting was prohibited because their meat was consumed, and their carapace was utilized for medicinal purposes (Nuwer, 2021). According to a study on *Rafetus swinhoei* hunters, it was reported that the population collapse of *R. swinhoei* in Vietnam occurred in two phases: first, in the 1980s, when the population size dramatically decreased. Second, in the early 1990s, when many hunters simultaneously collected multiple individuals from populations already experiencing severe impacts. There was also widespread consensus that after 1991–92, these turtles became extremely scarce (Pham Van *et al.*, 2020).

Surprisingly, this freshwater giant soft-shell turtle has been in the Indo-Myanmar, and Chinese regions for thousands to millions of years with no genetic variations (Minh Le *et al.*, 2014), whereas the river pollution, making dams on mighty rivers, and so-called global warming are very recent phenomena. Therefore, what was the main reason for these animals facing existential threats? We would rather say that the legal overtrade, lack of legislation to control these wildlife trading, trafficking, and the human food preferences of these mentioned areas will be on top of the reasoning.

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However, very recently, Le Duc *et al.* (2020) reported a skull of this turtle from northern Vietnam (Tho Xuyen swamp), with a great interest, some other surveys were conducted by following the previous reports and footprints to find at least one living individual of it. Fortunately, at the start of the year 2021, a giant female individual of this turtle species was discovered from in a lake in the Hanoi district, Vietnam (Carrington, 2021). We should not forget that it's a hope in the whole silent dark, but not a confirmation of success. Previously, scientists, breeders, and conservationists approached a fruitless breeding attempt and, later, on the tragic death of the only known living female individual (Nuwer, 2021). Captive breeding for the least studied species is always a nightmare for the abovementioned professionals; due to lack of living individual resources, less known biology of the long-lived turtle, and high risk. After discovering the only known living female individual from Vietnam, we have two pieces of news to share with the rest of the world. Firstly, we are seeing hope to save this species from extinction, and secondly, with a failed breeding attempt, we will add this species name to the list of dinosaurs. Obviously, we will hope for the best. This species needs to be conserved for proofing the existence of this species in the world.

## REFERENCES

- Al Jazeera. 2019. 'Last female' of rare turtle species dies in China zoo. *Al Jazeera English*. <https://www.aljazeera.com/news/2019/4/14/last-female-of-rare-turtle-species-dies-in-china-zoo>. Cited 14 April 2019
- Carrington, D. 2021. Hopes for most endangered turtle after discovery of female in Vietnam lake. *The Guardian*. <https://www.theguardian.com/environment/2021/jan/01/hopes-for-most-endangered-turtle-after-discovery-of-female-in-vietnam-lake>. Cited 1 January 2021.
- Heude, P.M. 1880. Memoire sur les Trionyx. Pp 1–38 (vol. 1). In *Memoires concernant l'histoire naturelle de L'Empire chinois par des Peres de la compagnie de Jesus*. Mission Catholique.
- Le Duc, O., Pham, T. Van, Zuklin, T., Bordes, C., Leprince, B., Ducotterd, C., Quang, V. L., and Luiselli, L. 2020. A new locality of presence for the world's rarest turtle (*Rafetus swinhoei*) gives new hope for its survival. *Journal for Nature Conservation* 55: 125833.
- Le, M., and Pritchard, C.H.P. 2009. Genetic variability of the critically endangered softshell turtle, *Rafetus swinhoei*: A preliminary report. *Proceedings of the First Vietnamese National Symposium on Reptiles and Amphibians* 1: 84–92.
- Le, M., Duong, H.T., Dinh, L.D., Nguyen, T. Q., Pritchard, P.C.H., and McCormack, T. 2014. A phylogeny of softshell turtles (Testudines: Trionychidae) with reference to the taxonomic status of the critically endangered, giant softshell turtle, *Rafetus swinhoei*. *Organisms Diversity and Evolution* 14: 279–293.
- Mayer, L.R. 2018. Better than Nessie: Freshwater turtle discovery galvanizes hope this earth month. *National Geographic Society Newsroom*. Cited 18 April 2018.
- Nuwer, R. 2021. The world's rarest turtle has a shot at escaping extinction. *The New York Times*, 25. <https://www.nytimes.com/2021/01/25/science/giant-softshell-turtle-vietnam.html>. Cited 25 January 2021.
- Pham Van, T., Le Duc, O., Leprince, B., Bordes, C., Luu, V.Q., and Luiselli, L. 2020. Hunters' structured questionnaires enhance ecological knowledge and provide circumstantial survival evidence for the world's rarest turtle. *Aquatic Conservation: Marine and Freshwater Ecosystems* 30: 183–193.
- Pritchard, P.C.H. 2001. Observations on body size, sympatry, and niche divergence in softshell turtles (Trionychidae). *Chelonian Conservation and Biology* 4:5–27.
- Solimine, K. 2013. World's largest freshwater turtle nearly extinct. *National Geographic*. <https://www.nationalgeographic.com/animals/article/130703-china-yangtze-giant-softshell-turtle-animal-science>. Cited 5 July 2013.
- Stanford, C.B., Rhodin, G.J., Van Dijk, P.P., Horne, V.D., Blanck, T., Goode, E.V., Hudson, R., Mittermeier, R.A., Currylow, A., Eiseberg, C., Frankel, M., Georges, A., Gibbons, P.M., Juvik, J.O., Kuchling, G., Luiselli, L., Haitao, S., and Singh, S. 2018. Turtles in trouble: The world's 25+ most endangered tortoises and freshwater turtles. In *Public*. IUCN SSC Tortoise and Freshwater Turtle Specialist Group, Turtle Conservancy, Turtle Survival Alliance, Turtle Conservation Fund, Chelonian Research Foundation, Conservation International, Wildlife Conservation Society, and Global Wildlife Conservation. [http://www.iucn-tftsg.org/wp-content/uploads/file/Top\\_25/Top\\_25+\\_Turtles\\_in\\_Trouble\\_2011.pdf](http://www.iucn-tftsg.org/wp-content/uploads/file/Top_25/Top_25+_Turtles_in_Trouble_2011.pdf)
- Trong, N.V. 2018. New individual of world's rarest turtle found in Hanoi. *Nhan Dan*, 1. <https://en.nhandan.vn/scitech/item/6033202-new-individual-of-world-s-rarest-turtle-found-in-hanoi.html>. Cited 12 April 2018.
- Wang, J., and Shi, H.T. 2011. The change of historical distribution of *Rafetus swinhoei*. *Acta Zootaxonomica Sinica*, 36: 919–924.

