Herpetology Notes, volume 16: 937-940 (2023) (published online on 19 December 2023)

A dragon in a trap! A record of using an aquatic trap to collect the Southeast Asian Water Monitor, *Varanus salvator macromaculatus* (Deraniyagala, 1944), in Indonesia (Squamata: Varanidae)

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Monitor lizards (genus *Varanus*) face significant threats in the wild, and 74 species are listed by the IUCN at different threat levels. Of the 85 known monitor lizard species, 12 are currently considered to be threatened, although ten of these species lack sufficient data for a robust assessment of extinction risk (IUCN, 2023; Uetz et al., 2023). Currently, the major threats affecting local varanid populations include the destruction of their natural habitats, uncontrolled global pet trade, human consumption, road mortality, and even human-discarded items, such as food and drink containers (Koch et al., 2013; Ayob et al., 2020; Zdunek and Kolenda, 2022). The Southeast Asian Water Monitor, *Varanus salvator macromaculatus*, is a semi-aquatic lizard, one of the most widely distributed varanids in Southeast Asia (Bennett, 1998; Auliya and Koch, 2020). *Varanus salvator*, regardless of any subspecies designations, was recently assessed as a species of "Least Concern" according to *IUCN Red List* criteria (Quah et al., 2021).

On 7 July 2023 at 13:15 h near Singkil Port, Aceh Province, Sumatra, Indonesia (2.2529°N, 97.7927°E; elevation near sea level), we were on a small motorboat in the Singkil Swamp Forest, downstream of the Alas-Singkil drainage basin (Fig. 1) when our attention was directed towards a partially submerged circular trap where movement was visible. In the aquatic trap, we saw a struggling adult *V. s. macromaculatus* (Fig. 2). The vegetation in this area is dominated by Nipa Palms and mangroves (*Rhizophora*, *Sonneratia*). Other distinctive plants include water hyacinths (*Pontederia crassipes*), *bakong ayer* (in Malaysian) reeds (*Hanguana malayana*), and golden leather ferns (*Acrostichum aureum*). During this time, we also saw two other water monitors on the banks of the river.

Our local guide explained to us that the meat of water monitors (called *biawak* in the Indonesian and Malaysian languages) is valued by local fishermen and that varanids were commonly captured in this type of trap, which is principally used for catching crabs. After conducting a short interview with our guide, we learned that the native Nias people are the main consumers of water monitor meat. Some of these lizards may also be distributed more widely, especially to North Sumatra, where they are in high demand and are used to make various products, including leather for commercial export. A large water monitor can be sold for IDR 60,000–80,000 (ca. EUR 3.50–4.75) and smaller or medium individuals may sell for IDR 30,000–60,000 (ca. EUR 1.75–3.50). This is a slightly higher price than in other provinces of Sumatra, rendering water monitor meat cheaper than chicken meat (Arida et al., 2020). There is considerable value in this trade, considering that the average income in Indonesia is just over EUR 2 per day (salaryexplorer.com).

In southern Sumatra (e.g., Palembang Province) water monitors are caught using snares and then used in the skin trade (Shine et al., 1996, 1999; Boscha et al., 2020). The situation is similar in North Sumatra Province (near Rantauprapat and Cikampak) where water monitors are caught using baited snares, nooses, or loop traps (Abel, 1998; Shine et al. 1998). While Arida et al. (2020) documented that the demand for skin seemed to be the same as meat consumption in North Sumatra Province

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(i.e., Tanjung Balai, Kisaran, Rantau Prapat, Inderapura, and Sei Rampah), water monitor meat is mainly used in different types of dishes, namely curry, soup, and deep-fried meat. In other parts of Indonesia, the meat is consumed as a novelty food, and also to treat a range of ailments, including eczema and asthma, or used as an aphrodisiac (Uyeda et al., 2014; Nijman, 2015).

Our observations shed new light on the potential threat to varanids in Aceh Province, Sumatra and while these are single observations, they broaden the scope of our understanding of the threats posed to these lizards. Surprisingly, the use of circular aquatic traps rather than the conventional snare traps (Shine et al., 1998; Dobson et al., 2019; Arida et al., 2020; Zdunek and Webb, 2023) is revealed for the first time in this province. Additionally, the practices of varanid meat consumption or leather trade have not been previously reported in Aceh Province.

Since the 1990s, Indonesian authorities have established a protection status for monitor lizards by National Decree (UU no. 5 tahun 1990 and Peraturan Pemerintah no 7 tahun 1999; Badan Pemeriksa Keuangan, 2023; Database Peraturan, 2023). In Sumatra, the hunting of water monitors raises questions about its legality and sustainability. Indeed, it is essential to consider the existing legal framework and enforcement mechanisms in the region in order to protect varanid populations. Hunting varanids can vary based on local regulations and conservation laws, but more needs to be done to ensure their protection. For example, in Sumatra hunting has been highlighted as a critical concern for 30 years (Shine 1996; Arida 2020). Our observations provide further insight into the widespread consumption and trade of water monitor meat, indicating that local communities view them as a valuable resource. To assess sustainability, it is essential to consider factors such as population size, reproductive rates, and the impact of hunting on the overall population dynamics of monitor lizards in the region, there is a need for up-to-date research similar to the work of Abel (1998) and Shine (1998).

The use of circular aquatic traps, as observed in Aceh Province, raises broader concerns about their potential impact on other aquatic and semi-aquatic herpetofauna. Similar trap designs have been known to effectively target herpetofauna (e.g., Sung et al., 2013; Tapley et al., 2021) or inadvertently capture non-target species (e.g. Bury, 2011).

By addressing the legality, sustainability, and

Figure 1. Example of the habitat in Singkil Swamp Forest, Aceh Province, Sumatra, Indonesia where our observation occurred. Photo by Pierre-Louis Stenger.

Figure 2. An adult *Varanus salvator macromaculatus*, recognisable by the characteristic pattern and positioning of the nostrils, caught in a circular aquatic trap. Photo by Pierre-Louis Stenger.

unintended impacts of trapping monitor lizards in Sumatra, we can better inform conservation efforts and the sustainable use of monitor lizards to ensure their long-term survival in Aceh Province and beyond. Taking proactive measures to safeguard the delicate balance of local ecosystems, as highlighted by the potential threats to monitor lizards, is crucial for preserving biodiversity and maintaining the health of natural habitats (Miranda, 2017; Doody et al., 2021).

Acknowledgements. We would like to thank our boat driver and Claudine from the MB Camp in Singkil for allowing this boat tour and for her precious information on this issue. Our thanks also go to Alice Bousseyroux, a fellow traveller who also witnessed this sighting, Grégory Deso for the pre-peer review of this manuscript, Leah Karas from the Natural History Museum of Vienna for help with the references search, and Benjamin Tapley for the review of this manuscript. Special thanks to Paul Freed whose precious help we can always count on.

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Accepted by Benjamin Tapley