

# Predation of an Adult Nile Monitor (*Varanus niloticus* Linnaeus, 1758) by a Nile Crocodile (*Crocodylus niloticus* Laurenti, 1768) in South Africa with Other Records of Interactions Between Monitor Lizards and Crocodilians

PRZEMYSŁAW ZDUNEK<sup>1,2,3</sup>, TJEERD DE WIT<sup>4</sup>, ARTHUR TOH KENG JEOW<sup>5</sup>,  
GEEMAL HAROLD<sup>6</sup> & BERNARD SEAH<sup>7</sup>

<sup>1</sup>*Pôle Sup Nature, 205 Rue de l'Acropole, 34000 Montpellier, France*  
E-mail: zdunek.komodo@gmail.com

<sup>2</sup>*NATRIX Herpetological Association, ul. Opolska 41/1, 52-010 Wrocław, Poland*

<sup>3</sup>*IUCN SSC Monitor Lizard Specialist Group member*

<sup>4</sup>*Friends of Magalies, 13 Crots St, Rietfontein, Pretoria, 0084, South Africa*

<sup>5</sup>*18-C Holland Drive #02-433, Singapore*

<sup>6</sup>*No. 483, Molakepupathana, Tissamaharama, Sri Lanka*

<sup>7</sup>*IUCN SSC Otter Specialist Group member*

**Abstract** - Large adult varanid lizards do not have many natural predators. Observations of direct predation of adult monitor lizards by crocodilians are rarely documented, and examination of stomach or fecal contents cannot accurately distinguish between cases of active hunting or scavenging. Here, we report a case of predation on an adult Nile monitor (*Varanus niloticus*) by an adult Nile crocodile (*Crocodylus niloticus*) observed in South Africa. In addition, we briefly discuss other interactions between crocodiles and varanids. Observations of this kind can expand what is known about the relationships between these taxa.

The family Varanidae contains the largest extant lizards and presently comprises 88 species (Uetz et al., 2024). Currently, the main and potential threats affecting local varanid populations include destruction of their natural habitat, uncontrolled global pet trade, human consumption, road mortality, anthropogenic traps, and even human-discarded items such as food and drink containers (Koch et al., 2013; Ayob et al., 2020; Zdunek & Kolenda, 2022; Zdunek et al., 2024a). In terms of natural predators, large varanid species do not have many as adults, although attacks by predatory birds, several snake species, Smooth-coated Otters *Lutrogale perspicillata*, conspecifics do occur (e.g., King & Green, 1999; Goldthorpe et al., 2010; Zdunek & Finlay, 2023; Zdunek et al., 2024b).

Observations of direct natural predation on adult varanid lizards by crocodilians are poorly documented (Ng & Mendyk, 2012). Bennett (1998) mentioned crocodile predation on *V. niloticus* without giving details of this

behavior or location. Cott (1961) recorded *V. niloticus* from the stomach contents of Nile crocodiles, *Crocodylus niloticus* (in Murchison, Uganda; the Luangwa, Kafue, and Zambesi Rivers, Northern Rhodesia; Upper Zambesi, Barotseland; Usutu River, Zululand); however, examination of stomach contents or feces does not allow for an accurate determination of whether these cases were the result of active hunting or scavenging or the age of the lizard. Below, a new record of direct predation is described, along with a brief overview of interactions between crocodiles and varanid lizards.

On 21 July 2022 at 1105 h, the predation of an adult *V. niloticus* (ca. 150 cm in total length) by an adult *C. niloticus* (ca. 3 m in total length) was observed at the Nkuhlu picnic area in Kruger National Park, South Africa (24°59'48.4368" S; 31°46'9.6996" E). The sky was clear with a light wind, and the ambient temperature was approximately 22° C. Several *V. niloticus* (approx. 5–6 individuals) were observed basking on a dead tree over-hanging the Sabie River (Fig. 1). The *C.*



**FIG. 1.** Several *Varanus niloticus* observed basking together on a dead tree overhanging the Sabie River, Kruger National Park, South Africa. Photographed by Tjeerd de Wit.

*niloticus* appeared to be aware of the lizards' presence, and remained motionless in the water below the tree, with only its eyes above the surface. After seven minutes, one of the lizards entered the water and swam close to the crocodile, unaware of its presence, and was immediately seized. The crocodile submerged briefly before resurfacing with the lizard in its jaws to swallow its prey quickly, without head-slapping, struggling, or shaking it (Fig. 2).

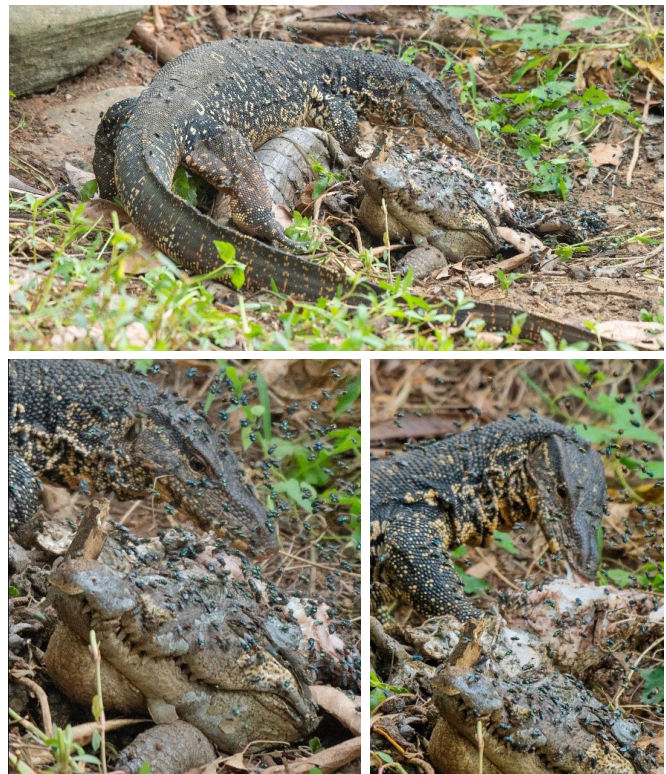
Interactions between these species may be common given their overlap in preferred habitats and geographical distribution (Spawls *et al.*, 2018). *Varanus niloticus* are known as “the most destructive” predators that feed on *C. niloticus* eggs, highlighting a significant relationship between the two species (Cott, 1961; Modha, 1967; Kofron, 1989; Steel, 1989). In Nigeria, Luiselli *et al.* (1999) indicated that an abundance of preferred dietary items available in the environment minimized interspecific competition, as exemplified by the relationship between West African dwarf crocodiles, *Osteolaemus tetraspis* and *V. niloticus*.

Other varanid species are also known to interact with crocodilians. Webb *et al.* (1982) found *Varanus* sp. (probably *V. mertensi*, pers. comm.) in the stomach of a *C. johnstoni* in the McKinlay River, Australia. Similar to Africa's monitor lizards, in another study *V. panoptes* destroyed up to 85% of *C. johnstoni* nests (Chibeba, 2003). Despite frequently foraging at crocodilian nesting sites, some varanid species do not appear to actively destroy them. For instance, *V. mertensi* rarely excavate crocodile nests themselves, but often raid eggs from already-opened *C. johnstoni* nests (Somaweera *et al.*, 2013). In northern Australia, *C. porosus* eggs were found in the stomachs of *V. indicus* (Magnusson, 1982). In Asia, *V. bengalensis* can fall victim to *C. palustris* predation (Bindiya Senarath, pers. comm.), whereas *V. salvator salvator* may opportunistically feed on crocodile carrion (Fig. 3) and is a predator of *C. porosus*, *C. palustris*, *Gavialis gangeticus*, and *Tomistoma schlegelii* nests (Somaweera *et al.*, 2013).



**FIG. 2.** *Crocodylus niloticus* predating on an adult *V. niloticus* in the Sabie River, Kruger National Park, South Africa. Photographed by Tjeerd de Wit.

*Crocodylus porosus* also appears to be one of the only predators in Singapore capable of consuming adult *V. salvator macromaculatus* (Ng & Mendyk, 2012; Anonymous, 2021; Fig. 4, 5 & 6). In Papua New Guinea, Hall & Johnson (1987) reported varanid predation on the nests of *C. novaeguineae* but did not specify the species. These accounts suggest that varanids often interact with crocodiles by predating their

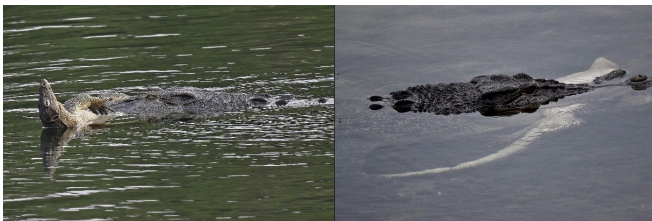


**FIG. 3.** An adult Sri Lankan water monitor *V. salvator salvator* scavenging on an adult mugger crocodile *Crocodylus palustris* carcass. Weerawila Lake, Hambantota District, Sri Lanka, 17 February 2023. Photographed by Geemal Harold.





**FIG. 4.** *Crocodylus porosus* predation on an adult *V. salvator macromaculatus* at Sungei Buloh Wetlands Reserve, Singapore, 23 January 2021. Photographed by William Ko.



**FIG. 5.** *Crocodylus porosus* predation on an adult *V. salvator macromaculatus*. Sungei Buloh Wetlands Reserve, Singapore, 17 October 2023. Photographed by Arthur Toh Keng Jeow.



**FIG. 6.** Predation of a juvenile *V. salvator macromaculatus* by a subadult *C. porosus*. Sungei Buloh Wetlands Reserve, Singapore, 29 July 2024. Photographed by Bernard Seah.

nests, and less often in direct predation by crocodiles.

Direct observations of predation enrich what is known about the natural history of species by adding details on hunting techniques, feeding, and the age classes of both predator and prey. Presented here is the first documented observation of direct predation by *C. niloticus* on a *V. niloticus* in Kruger National Park, South Africa. Observations such as these,

even as single events, can broaden the scope of information about the natural history and ecology of monitor lizards and their crocodilian predators. Another interesting aspect of the described observation is the group of *V. niloticus* basking in the same tree (Fig. 1), which does not appear to be a common occurrence in monitor lizards (Zdunek & Chaw, 2023).

**Acknowledgments** – We would like to thank Karol Wałach and William Ko for their help in the preparation of this manuscript and for sharing their knowledge and observations. Special thanks to Paul Freed and Wilhelm Joshua S. Tan.

## REFERENCES

- Anonymous. 2021. Singapore man captures grisly photos of crocodile ripping apart monitor lizard for lunch. SE Asia Mashable. <https://sea.mashable.com/culture/14210/singapore-man-captures-grisly-photos-of-crocodile-ripping-apart-monitor-lizard-for-lunch>. Last accessed: 22 February 2023.
- Ayob, N., A.M. Muzneena, J. Senawi, N. & Ahmad. 2020. Herpetofauna roadkills on Langkawi Island, Peninsular Malaysia: The influence of landscape and season on mortality distribution. *Sains Malaysiana* 49(10): 2373–2382.
- Bennett, D. 1998. Monitor lizards: Natural History, Biology, Husbandry. Edition Chimaira, Frankfurt am Main. 352 pp.
- Chibeba, A.M. 2003. Nesting ecology of the Australian freshwater crocodile, *Crocodylus johnstoni*, on the Mckinlay River: Setting a baseline for assessing the potential impact of the exotic cane toad, *Bufo marinus*. M.S. Thesis, Charles Darwin University, Australia.
- Cott, H.B. 1961. Scientific results of an inquiry into the ecology and economic status of the Nile crocodile (*Crocodylus niloticus*) in Uganda and Northern Rhodesia. *Transactions of the Zoological Society of London* 29: 211–358.
- Goldthorpe, G., C. Shepherd, S. Hogg & B. Leupen. 2010. Predation of water monitor lizard (*Varanus salvator*) by smooth-coated otter (*Lutrogale perspicillata*) in Peninsular Malaysia. *IUCN Otter Specialists Group Bulletin* 27(2): 78–84.
- Hall, P.M., & D.R. Johnson. 1987. Nesting biology of *Crocodylus novaeguineae* in Lake Murray district, Papua New Guinea. *Herpetologica* 1987: 249–258.
- King, D. & B. Green. 1999. Monitors: The Biology of Varanid Lizards. 2nd ed. Krieger, Malabar. 116 pp.
- Koch, A., T. Ziegler, W. Bohme, E. Arida & M. Auliya. 2013. Distribution, threats, and conservation status of the monitor lizard (Varanidae: *Varanus* spp.) of Southern Asia and the Indo-Australian archipelago. *Herpetological Conservation and Biology* 8: 1–62.
- Kofron, C.P. 1989. Nesting ecology of the Nile crocodile, *Crocodylus niloticus*. *African Journal of Ecology* 27: 335–341.

- Luiselli, L., G.C. Akani & D. Capizzi. 1999. Is there any interspecific competition between dwarf crocodiles (*Osteolaemus tetraspis*) and Nile monitors (*Varanus niloticus ornatus*) in the swamps of Central Africa? A study from south-eastern Nigeria. *Journal of Zoology* 247: 127–131.
- Magnusson, W.E. 1982. Mortality of eggs of the saltwater crocodile, *Crocodylus porosus*, in northern Australia. *Journal of Herpetology* 16: 121–130.
- Modha, M.L. 1967. The ecology of the Nile crocodile, *Crocodylus niloticus* Laurenti, on Central Island, Lake Rudolf. *African Journal of Ecology* 5: 74–95.
- Ng, M. & R.W. Mendyk. 2012. Predation of an adult Malaysian water monitor *Varanus salvator macromaculatus* by an estuarine crocodile *Crocodylus porosus*. *Biawak* 6(1): 34–38.
- Somaweera, R., M. Brien & R. Shine. 2013. The role of predation in shaping crocodilian natural history. *Herpetological Monographs* 27: 23–51.
- Spawls, S., K. Howell, H. Hinkel & M. Menegon. 2018. *Field Guide to East African Reptiles*. 2nd edition. Bloomsbury Publishing, London. 624 pp.
- Steel, R. 1989. *Crocodiles*. Christopher Helm, London. 198 pp.
- Uetz, P., P. Freed, R. Aguilar, F. Reyes & J. Hošek. 2024. The Reptile Database. <http://www.reptile-database.org>. Last accessed: 4 April 2024.
- Webb, G. J. W. & S.C. Manolis. 1982. *Crocodylus johnstoni* in the McKinlay River area, N.T. I. Variation in the diet, and a new method of assessing the relative importance of prey. *Australian Journal of Zoology* 30: 877–899.
- Zdunek, P., A. Bouazza & G. Martinez del Marmol. 2024a. Dragons in desert trouble: Anthropogenic wells as a potential threat to the desert monitor, *Varanus griseus* (Daudin, 1803), in Morocco. *Herpetology Notes* 17: 821–826.
- Zdunek, P. & A. Chew. 2023. Biodiversity record: Clouded monitors, *Varanus nebulosus*, group basking. *Nature in Singapore* 16: e2023044.
- Zdunek, P. & M. Finlay. 2023. First reported predation of a clouded monitor (*Varanus nebulosus*) by the reticulated python (*Malayopython reticulatus*) in Singapore. *Herpetology Notes* 16: 151–153.
- Zdunek, P., H. Geemal, H. & S. Karunarathna. 2024b. Additional records of intrageneric predation and cannibalism in monitor lizards (Squamata: Varanidae). *Herpetology Notes* 17: 749–755.
- Zdunek, P. & K. Kolenda. 2022. The threat of discarded food and drinks containers to monitor lizards. *Herpetological Bulletin* 161: 28–30.