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## Tongue Punching, an unknown secondary antipredatory function of the tongue-shooting in chameleons (Reptilia: Chamaeleonidae)

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### INTRODUCTION

Chameleons are well known for their ability to use camouflage of their body shapes, colors and behaviors, to blend with the environment and become invisible for both prey as well as predators.

When they face a predator, they perform a series of anti-predatory behavioral mechanisms to secure their survival, such as: bobbing, tail movements, gaping, biting, grasping, akinesis, thanatosis, swinging, buzzing, spine thrusting and others (NEČAS, 1999; TOLLEY & HERREL, 2014).

Amongst all antipredatory mechanisms, however, an active use of the tongue has been mentioned in chameleons only as a part of “gaping”, when a brightly colored tongue and mucous of the mouth of some species can scare the predators by a sudden appearance, similar to the threat display of the brightly blue tongues in the Bluetongue Skinks – *Tiliqua scincoides* (WHITE 1790)(see BADIANE & ALL. 2018), Shinglebacks – *Tiliqua rugosa* (Gray, 1825), Leaf-Tailed geckos of the genus *Uroplatus* DUMÉRIL, 1806 (see SVATCK & VAN DUIN 2001) or Gila Monsters – *Heloderma suspectum* (WIEGMANN, 1829)(see SCHWANDT 2019).

### EVIDENCE

In 2004, an anonymous local man in Ethiopia, Goba, N-slopes of the Bale Mountains, explained to me, that chameleons are very dangerous to humans for two reasons:

First: “If a man is envisioned by a chameleon with both eyes, it will crush his testicles and as result, he will become infertile until the end of his days.”

Second: “If a man (or an animal) looks deep into chameleon’s eyes from close vicinity, it will shoot the tongue in his eye and hurt him.”

As both stories seemed to have a clear herpetoethnographical touch; and, as such, they should not be taken literally but rather metaphorically, I considered both a legend and interpreted them similar to many other stories about chameleons in Africa, as an expression of the fear of the unknown and strange animal.

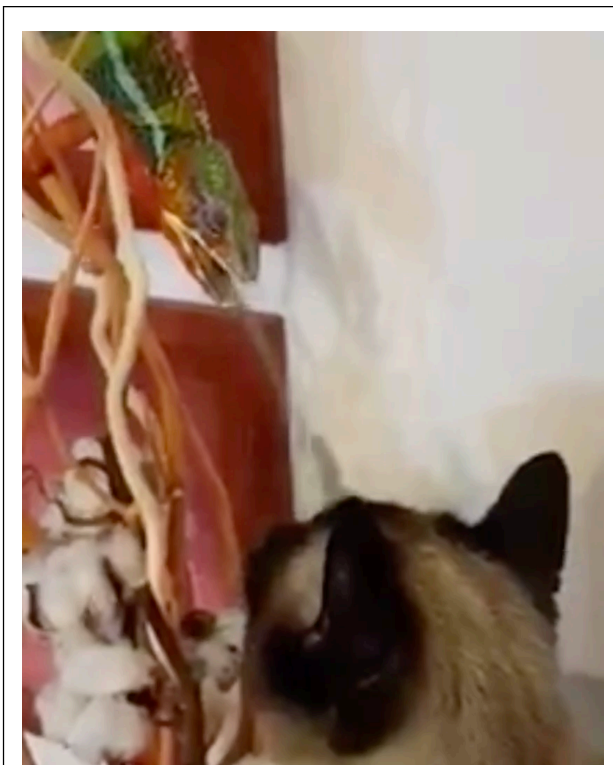
It was only in 2007, when I observed at daytime an interaction of a Pearl-Spotted Owlet – *Glaucidium perlatum* (VIEILLOT, 1817) and a big male of the Yellow-Crested Jackson’s Three-Horned Chameleon – *Trioceros jacksonii xantholophus* (EASON, FERGUSON & HEBRARD, 1988), sitting on a tree in a height of around 5m from the ground in the eastern suburbs of Meru, E-slopes of Mt. Kenya, Kenya. The owl was sitting motionless on a horizontal branch around noon and looking forwards. The chameleon was moving slowly through the canopy of same tree, it selected the same branch and unintentionally moved slowly closer to the owl and approached it from the side. As the branch was leafless and exposed, about 40 cm



**Fig 1.** *Chamaeleo calyptratus* tongue-punching a man in his nose  
Foto courtesy ALEXANDER DUIROV

from the owl, it performed the chameleon-typical “leaf walking”: swinging back and forth, imitating a leaf, and continued to move in the direction of the owl. It noticed the chameleon and turned the head towards it. This was the moment, when the chameleon first visibly noticed the owl, it opened the mouth and after about two seconds of gaping and side swinging, it shot its tongue towards the owl’s eyes. The owl immediately took off and flew away and the chameleon continued to move on its trajectory in the canopy.

In early 2000s, E. ADRIGNOLA (IN LITT.) made the following observations on captive *Trioceros deremensis* (Matschie, 1892) from Tanzania: “I had a group of *Trioceros deremensis*, with the females together in a large open enclosure. They would shoot their tongue very far at the males - over a foot away. Most of the time it was stopped before striking them, as if it were part of the threat display. My female *Trioceros deremensis* would smack the males with their tongue when non receptive. They were the sweetest chameleons, really. But against the males when not receptive... Evil. Solid black, tongue smacking, evil.”



**Fig 2.** *Furcifer pardalis* tongue-punching domestic cat.  
Foto courtesy PETR KREJČA

In 2018, I was personally shot into my eye by a captive gravid female of the Arabian Chameleon – *Chamaeleo arabicus*, MATSCHIE, 1893, during cleaning of its enclosure. The female was due to gravidity very aggressive. Besides of threat display, she attacked proactively. (PETR NECAS, PERS.OBS.) E. ADRIGNOLA (IN LITT.) confirms same

observation in the case of an captive aggressive male *Chamaeleo calyptratus*.

In 2018, F. FINETTI (IN LITT.) made an observation on one of the captive *Furcifer lateralis* (GRAY, 1831), which she keeps: “the female punched with its tongue an imposing male to the head, when she was not receptive.”

On 22th November 2018, PETR KREJČA (IN LITT.) recorded a video of a domestic cat, watching a captive, 14-months old male of the Panther Chameleon – *Furcifer pardalis* (CUVIER, 1829) from Ambanja, Madagascar from a distance of about 30cm. The chameleon noticed the cat and after few seconds of gaping, it shot with its tongue between the cat’s eyes. The cat ran away immediately. It was incidentally filmed and the video was posted in Facebook.

In 2019, BETTINE WEBER VD GALLIËN (IN LITT.) reported about an unusual behavior of her captive, 6 years old female of the Yemen Chameleon – *Chamaeleo calyptratus* DUMÉRIL & DUMÉRIL, 1851, which shot against her eyes when approached while sitting in its cage. She delivered a video and photos demonstrating this phenomenon, which repeats randomly on the course of several years. Not only eyes, but any foreign body passed close to it is attacked by the tongue.

In 2020, ALEXANDER DIUROV (IN LITT.) shared a video of a captive adult male Yemen Chameleon – *Chamaeleo calyptratus*, repeatedly shooting the tongue towards his eyes when imitating and mirroring his gaping and aggressive movements while approaching it in its terrarium. This behavior repeats always, when a human face appears close to the chameleon individual.

In 2020, M. COLLEEN (IN LITT.) reported about being shot in the eye by an adult *Chamaeleo calyptratus* while cleaning its cage after the arm was attacked physically with open mouth.

In April 2020, an ANONYMUS (2020) posted a video in the internet, where a White-Bellied Caique Parrot – *Pionites leucogaster* (KUHLE, 1820) approached in an artificially set up scene a adult male *Chamaeleo calyptratus*, which after wide gaping with abducted lips and hissing, punched the parrot into the head with its tongue. The parrot immediately escaped.

All the available original videos have been compiled into one and posted with a commentary on YouTube for further reference (NECAS 2020).

## CONCLUSIONS

The above described behavioral pattern, has always the same scenario: the chameleons notices a danger, it perceives the subject very likely as predator, warns it with body swinging and gaping and then shoots the tongue towards it, preferably at head, to hit the predator into or between the eyes.

Very likely, the main indicator of the predator in this ca-

se are big visible eyes, positioned on a more or less flattened frontal surface of the head and pointing forwards (like in birds and cats; and similarly primates including humans).

The probable function of this behavior is a threat display, to surprise the predator with an unexpected action, to which the latter may react with escape, leaving the approached or attacked chameleon alive. Based on all observed cases, and own experience of the attacked humans, the surprise is quite effective to shock the predator to stop the previous action and move away. Therefore, the “tongue-punching” should be introduced as a neologism for the newly defined antipredatory mechanism, found uniquely in chameleons.

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