

***Bitis (Macrocerastes) hoserae* Hoser, 2013 split.**

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ABSTRACT

In 2013, I (Raymond Hoser) published several papers that formed a major revision of the African viperidae, which among other things, split the putative species *Bitis (Macrocerastes) nasicornis* (Shaw and Nodder, 1792) across the Dahomey Gap into two species.

The central African taxon became known as *B. hoserae* Hoser, 2013 and is readily separated from *B. nasicornis* by the fact that under the eye there is no white separation of the brown on the upper labials, this being semi-circular in *B. nasicornis*.

Since the publication of Hoser, 2013 it has emerged that within putative *B. hoserae*, two quite divergent populations exist.

While more closely related to one another than they are to *B. nasicornis*, they diverged an estimated 1.5 MYA and so the population centred on Cameroon in Africa is formally named as *B. awe* sp. nov.. The name-bearing population from the Democratic Republic of Congo, Uganda, South Sudan, Kenya and nearby remains as *B. hoserae*.

Keywords: Taxonomy; nomenclature; Africa; Viper; viperidae; snake; Cameroon; *Bitis*; *Macrocerastes*; *hoserae*; *nasicornis*; new species; *awe*.

INTRODUCTION

In 2013, I (Raymond Hoser) published a major revision of the African viperidae, which among other things, split the putative species *Bitis (Macrocerastes) nasicornis* (Shaw and Nodder, 1792) across the Dahomey Gap into two species.

The central African taxon became known as *B. hoserae* Hoser, 2013 and is readily separated from *B. nasicornis* from East Africa by the fact that under the eye there is no white separation of brown on the upper labials, this being semi-circular in *B. nasicornis*.

Since the publication of Hoser, 2013 it has emerged that within putative *B. hoserae*, two quite divergent populations exist.

While more closely related to one another than they are to *B. nasicornis*, which is why Hoser (2013) treated them as a single species, the two populations diverged an estimated 1.5 MYA based on samples at Genbank and so the population centred on Cameroon in Africa is formally named as *B. awe* sp. nov.. The name-bearing population from the Democratic Republic of Congo, Uganda, South Sudan, west Kenya and nearby remains as *B. hoserae*. *B. nasicornis* is confined to rainforests west of the Dahomey Gap in Sub-Saharan west Africa, mainly in Ghana, The Ivory Coast and to a lesser extent, Liberia.

MATERIALS AND METHODS

Live and dead specimens within the *B. nasicornis* / *B. hoserae* complex were examined from across their known distribution to identify consistent differences between the three populations.

Upon identification of consistent differences between the east and west populations of *B. hoserae*, the decision was made to formally identify the species from the west of the range of putative *B. hoserae* as a new taxon, namely *B. awe* sp. nov. in accordance with the rules of the *International Code of Zoological Nomenclature* (Ride et al. 1999)..

BITIS MACROCERASTES AWE SP. NOV.

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Holotype: A preserved specimen at the California Academy of Sciences, San Francisco, USA, specimen number CAS HERP 253603 collected from a campsite at the Dja Reserve, Sud Province, Cameroon, Africa, Latitude 3.102568 N., Longitude 12.313583 E. at an elevation of about 646 metres ASL. This facility allows access to its holdings. The holotype snake has an SVL of 272 mm and tail of 22 mm.

Paratypes: 1/ A preserved specimen at the National Museum of Natural History, Smithsonian Institution,

Washington, DC, USA, specimen number USNM Amphibians & Reptiles 571013 collected from Nyasoso in the south-west region of Cameroon, Africa, Latitude 4.83 N., Longitude 9.68 E. at 900 metres ASL. 2/ A preserved juvenile specimen at the National Museum of Natural History, Smithsonian Institution, Washington, DC, USA, specimen number USNM Amphibians & Reptiles 571015 collected from Mt. Nlonako in the Littoral Province, Cameroon, Africa, Latitude 4.54 N., Longitude 9.58 E. at 1660 metres ASL. 3/ A preserved specimen at the California Academy of Sciences, San Francisco, USA, specimen number CAS HERP 16983 collected from near the Ogooue River, Lambarene, Moyen-Ogooue Province, Gabon, Africa, Latitude -0.6958 S., Longitude 10.2230 E. 4/ Six preserved specimens at the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA, specimen number MCZ Herp R-7862 (all six), collected from Kribi, Cameroon, Africa, Latitude 2.95 N., Longitude 9.917 E.

Diagnosis: Both *Bitis hoserae* Hoser, 2013 and *B. awe* sp. nov. are readily separated from *B. nasicornis* (Shaw and Nodder, 1792) by the fact that the dark colouring of the upper labials below the eye runs into the eye, without complete separation by white below the eye as is seen in *B. nasicornis*.

This consistent trait allows for identification of the relevant species from photos alone.

Also of note is that the dark patch under the eye of *B. nasicornis* advances considerably anterior to the eye, as opposed to only slightly forward of the eye in *Bitis hoserae* and *B. awe* sp. nov..

In turn *B. hoserae* is readily separated from *B. awe* sp. nov. by the fact that the darker intrusions from the venter to the mid-flanks are bounded by well-defined black at the top edge, versus no such well-defined black edge in *B. awe* sp. nov.. The dark blackish blotches on the dorsum are bounded by bold purple red in adult *B. hoserae*, versus a more diffuse colour in adult *B. awe* sp. nov..

It should also be noted that *Bitis awe* sp. nov. from Nigeria sometimes have a triangular patch under the eye (not the semicircle of *B. nasicornis*), the base of the triangle being at the labials, but with the dark upper tip intersecting the orbit and dividing lighter areas into two. At the labials, there may be some lighter scales, but these do not form a continuous strip as seen in *B. nasicornis*. All of *B. hoserae*, *B. awe* sp. nov. and *B. nasicornis* are diagnosed as follows: They are a large and stout True Viper, similar in many respects to *B. gabonica* but easily separated from that taxon by their large raised granular scales on the upper surfaces of the head, neck and upper body.

The three species *B. hoserae*, *B. awe* sp. nov. and *B. nasicornis* range in length from 72 cm to 107 cm. Spawls *et al.* (2004) mentioned a maximum length of 120 cm, but admitted that this is exceptional, quoting an average length of 60-90 cm. Females grow larger than males.

The head is narrow, flat, triangular and relatively small compared to the rest of the body. The neck is thin. These snakes have a distinctive set of two or three horn-like scales on the end of their

noses, the front pair of which may be quite long. The eyes are small and set well forward. The fangs are not large,

in contrast to the *B. gabonica* species complex and are rarely more than 1.5 cm in length.

There are 31-43 dorsal midbody scale rows. These are so rough and heavily keeled that they occasionally inflict cuts on handlers when the snakes struggle, again diagnostic of the three species. There are 117-140 ventrals, single anal and 16-32 subcaudals, with males having a higher count

(25-30) than females (16-19).

The distinct dorsal colour pattern consists of a series of 15-18 blue or blue-green, oblong markings, each with a lemon-yellow line down the center. These are enclosed within irregular, black,

rhombic blotches. A series of dark crimson triangles run down the flanks, narrowly bordered with green or blue. Many of the lateral scales have white tips, giving the snake a velvety appearance. The top of the head is blue or green, overlaid with a distinct black arrow mark. The belly is dull green to dirty white, strongly marbled and blotched in black and gray.

Distribution: *B. awe* is found east of the Dahomey Gap in equatorial Africa, from about Nigeria in the west, into Cameroon, Equatorial Guinea, Gabon, Congo (Brazzaville) and into the western part of the Central African Republic. *B. hoserae* is herein confined to the Democratic Republic of Congo (DRC), Uganda, South Sudan, Rwanda and west Kenya.

B. nasicornis is found in wetter areas west of Ghana and including parts of west Togo.

Etymology: *B. awe* sp. nov. is named in reflection of the "awe" people have when encountering this magnificent serpent. The name is also short and therefore easy to remember.

Conservation: In spite of a putative wide distribution for all three species within the *B. nasicornis* / *B. hoserae* complex, intense human population growth in the relevant region is putting all three species at long-term risk of extinction. The most secure of the trio is *B. hoserae*, mainly because a lot of good habitat for this taxon is within national parks and reserves in Kenya and Uganda. Captive populations should be maintained as a safeguard against precipitous declines in the wild.

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CONFLICTS OF INTEREST - NONE.

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