

A review of *Hemirhagerrhis viperina* (Bocage) (Serpentes: Colubridae), a rupicolous Psammophine snake

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ABSTRACT

Most of the recorded specimens of *Hemirhagerrhis viperina* (Bocage) have been examined and compared with abundant material of *H. nototaenia* from central Africa. *H. viperina* can be most readily distinguished by its relatively short tail and colour pattern, but there are also average differences in several head shield characters. Although sympatry or parapatry has not been recorded, *H. viperina* is a rupicolous species, whereas *H. nototaenia* is an arboreal form in dry savanna, so the two forms are considered to be specifically distinct.

INTRODUCTION

The genus *Hemirhagerrhis* was erected by Boettger in 1893, with *H. kelleri* Boettger as type species by monotypy. In the same year Stejneger proposed that *Ablabes hildebrandtii* Peters 1878 and *Coronella nototaenia* Günther 1864 should be included in *Hemirhagerrhis*, but Boulenger (1896) included *nototaenia* in the genus *Amplorhinus* A. Smith, with *Psammophylax viperinus* Bocage 1873 and *A. hildebrandtii* Peters 1878 as synonyms. Bogert (1940) pointed out that *nototaenia* has a typical Psammophine hemipenis and is obviously congeneric with *H. kelleri*, leaving *Amplorhinus* as a monotypic genus of uncertain affinities. Bogert also revived *viperinus* as a subspecies of *H. nototaenia*, although he subsequently had doubts about this status: "I wonder whether you may not eventually find that snakes as different in pattern as well as tail-length, with rather extensive mean differences in ventrals and subcaudals, may not prove to be separate species, unless intergrades turn up in samples of *Hemirhagerrhis*" (pers comm., 11 April 1986).

Bogert (1940) tabulated the differences in ventral and caudal counts between *nototaenia* and *viperina*, with an overlap in caudal counts (68-98 vs. 52-75). The highest subcaudal count for *H. viperina* was based on Bocage (1895), who recorded 177 ventrals and 75 subcaudals for a snake from Humbe, Angola. In this work he mentions six specimens, the type specimen of *P. viperinus* from Dombe, two from Maconjo, one from Capangombe and two from Humbe. In a footnote (p. 109), he provides ventral and subcaudal counts for one individual each from Capangombe, Humbe and Maconjo. However, when I examined the material in the Museu Bocage in 1968, I found only five specimens: one from Dombe and two each from Maconjo and Capangombe. The missing specimens from Humbe may have been typical *H. nototaenia*. The Museu Bocage collection was subsequently destroyed by fire.

Since Bogert (1940), additional material of *H. viperina* from southern Angola and northern Namibia has accu-

mulated, mostly in the Transvaal Museum and the National Museum of Namibia. Although there is still no evidence of either sympatry or intergradation between typical *H. nototaenia* and *viperina*, I decided to analyse the available data in an attempt to determine the status of *viperina*.

MATERIAL AND METHODS

I have examined most of the available material of *H. viperina* (29 specimens) and most of the material of *H. nototaenia* (151 specimens) from areas between 8° and 23°S to the east of Angola and Namibia, i.e. Botswana, Zambia, Zimbabwe, Malawi, Mozambique and southern Tanzania.

The following characters were recorded for each specimen: colour pattern; number of supralabials and those entering orbit; number of infralabials and those in contact with the anterior sublinguals; number of preoculars, postoculars and temporals (anterior + posterior); dorsal scale rows anteriorly, at midbody and posteriorly (17-17-13 in all specimens); number of ventrals by the Dowling (1951b) method; number of subcaudals, excluding the terminal spine (the anal shield was divided in all specimens examined); length from snout to vent, plus tail, in mm measured against a white-face tape.

Dorsal scale reduction formulae were recorded for a sample of each species, using the Dowling (1951a) method, the collated data being presented in the modified form previously used (Broadley, 1977).

Maxillary tooth formulae appear with the number of solid anterior teeth in arabic numerals separated by a + sign from the number of grooved fangs indicated by roman numerals, e.g. 9+II.

Institutional abbreviations follow Leviton *et al.* (1985), with the addition of AJL = A.J. Lambiris collection, JPT = J.P. Tello collection and SPQ = Sable Park collection (Kwekwe, Zimbabwe).

A figure in parentheses after a catalogue number indicates the number of specimens bearing that number.

CHARACTER ANALYSIS

1. Ventral shields

The variation in number of ventrals is shown in Table 1. There is no sexual dimorphism, so the data for both sexes are combined. There is no significant difference between the two species.

TABLE 1: *Hemirhagerrhis viperina* and *H. nototaenia*: variation in ventral and subcaudal counts and Tail/total length ratio.

SPECIES	VIPERINA	NOTOTAENIA
Ventrals		
Range	156-183	153-179
Mean	164,67 (n = 28)	168,93 (n = 141)
S.D.	7,26	4,61
C.V.	4,41	2,73
Subcaudals		
Range	52-66	68-90
Mean	58,73 (n=27)	76,63 (n = 133)
S.D.	3,80	4,00
C.V.	6,47	5,22
Tail/total length ratio		
Range	.17-.21	.22-.29
Mean	.195 (n = 22)	.2483 (n = 128)
S.D.	.0090	.0153
C.V.	.0005	.0006

2. Subcaudal shields

The variation in number of subcaudals is shown in Table 1, there is again no sexual dimorphism. The two species are clearly separated on this character, with no overlap in range of counts, the Coefficient of Difference being 2,24. Hoervers & Johnson (1982) have recorded higher counts for *H. nototaenia* in southern Somalia (85-103).

3. Dorsal scale row reduction formulae

The dorsal scale row reduction formulae can be summarised as follows:

H. viperina **17** 2+3, 3+4, 4+5 or 5+6 (102-118) **15** 2+3, 3+4, 4+5 or 5+6 (109-126) **13** n=5.

H. nototaenia **17** 3+4, rarely 4+5 or 5+6 (84-108) **15** 3+4, rarely 2+3 or 4+5 (104-119) **13** n=10.

H. viperina is more variable and the reductions tend to take place closer together and more caudad than in *H. nototaenia*.

4. Infralabial formula

In *H. viperina* the usual formula is 10, the first five in contact with the anterior sublinguals, whereas the normal formula in *H. nototaenia* is 9(4). Variation in number of infralabials is shown in Table 2.

TABLE 2: *Hemirhagerrhis viperina* and *H. nototaenia*: variation in number of infralabials and temporal formula (anterior + posterior).

SPECIES	VIPERINA		NOTOTAENIA	
Infralabials	sides	%	sides	%
7	—	—	1	0,3
8	—	—	10	3,4
9	2	3,8	242	81,2
10	46	88,5	42	14,1
11	4	7,7	3	1,0
Temporals				
1+2	5	8,6	287	93,2
1+3	10	17,2	10	3,2
2+2	3	5,2	4	1,3
2+3	40	69,0	7	2,3

5. Temporal formula

In *H. viperina* the most common formula is 2+3, followed by 1+3. In contrast the usual formula in *H. nototaenia* is 1+2, although Hoervers & Johnson (1982) reported 2+3 as normal in southern Somalia. Variation in temporal formula is shown in Table 2.

6. Position of nostril

In *H. viperina* the nostril is pierced nearly vertically in the nasal, whereas in *H. nototaenia* it is pierced dorsolaterally.

7. Maxillary dentition

Bogert (1940) recorded 9+II maxillary teeth for two Angolan specimens of *H. viperina* and a Tanzanian specimen of *H. nototaenia*, Stejneger (1893) also recorded 9 anterior maxillary teeth in a Kenyan specimen of *H. nototaenia*. However, two specimens of this species from Botswana and Zimbabwe have 10+II maxillary teeth, and Bourgeois (1968, Fig. 63) illustrates the same arrangement in a Zaire specimen. Dr. Garth Underwood (*in litt.*) examined the dentition of another *H. viperina* (BM 1906.8.24.75) and recorded 8+II maxillary teeth.

8. Ratio tail length/total length

This character was used by Bogert (1940) and it clearly separates the short-tailed *H. viperina* (.17 to .21) from *H. nototaenia* (.22 to .29). See Table 1.

9. Colour pattern

The two species differ considerably in colour pattern. *H. viperina* is very variable in pattern. The ground colour varies from cream to dark grey, the tail bright orange posteriorly and the ventrum always paler than the dorsum. The head is pale with sparse dark speckling and usually two dark streaks extending diagonally from the eye to the posterior supralabials (Fig. 1). The dorsal markings are usually brown and may consist of staggered rows of spots (Fig. 3), a zigzag line which led Bocage (1873) to apply the name *viperinus* to this snake (Fig. 7) or paired synchronised blotches more like the markings of *H. nototaenia* (Fig. 5).

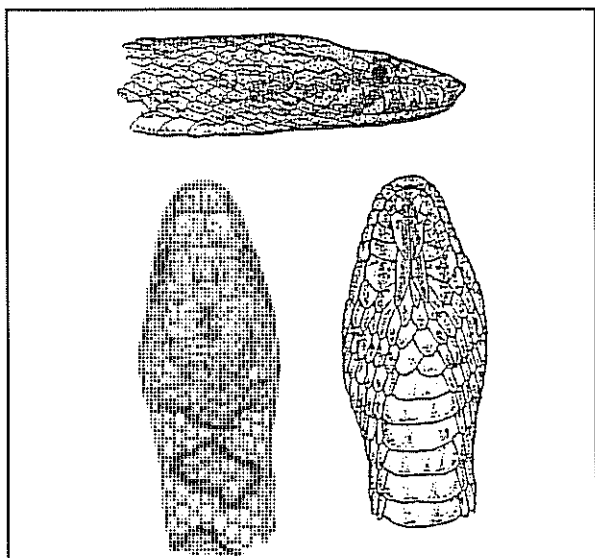


FIGURE 1: *Hemirhagerrhis viperina*: AMNH 50506 - Huambo, Angola. Lateral, dorsal and ventral views of head (x 4) (after Bogert, 1940).

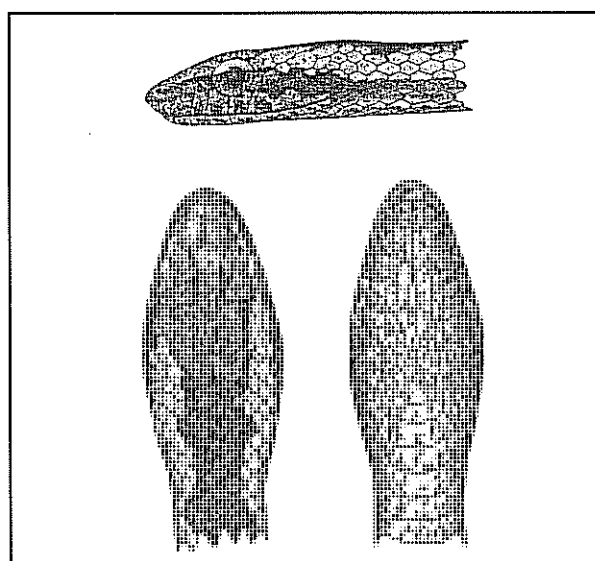


FIGURE 2: *Hemirhagerrhis nototaenia*: MRAC 9325 - N'gayu, Shaba Province, Zaire. Lateral, dorsal and ventral views of head (x 4) (after Witte, 1953).

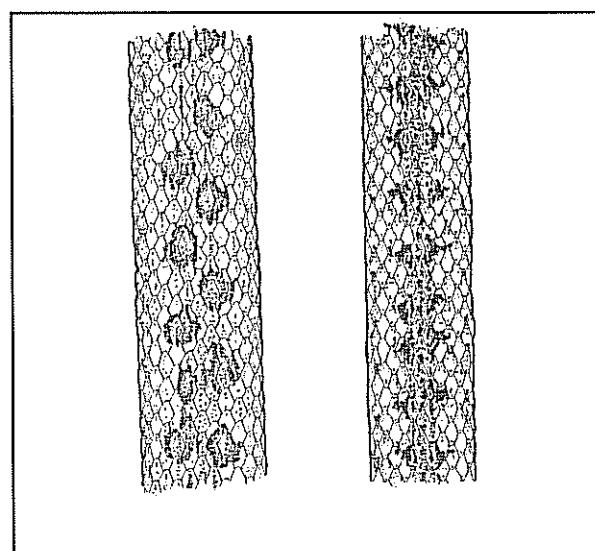


FIGURE 3: Comparison of patterns at midbody (x 3).
A - *Hemirhagerrhis viperina* AMNH 50506 - Huambo, Angola.
B - *Hemirhagerrhis nototaenia* AMNH 50505 - Tindi, Tanzania.

H. nototaenia is grey above and below. The top of the head is dark speckled, with a pale stripe that passes through the upper part of the iris of the eye, while a black lateral stripe passes through the rest of the eye (Figs. 2, 8, 9). A darker vertebral stripe is bordered by paired black triangles with their apexes pointing outwards (Fig. 3) these may be synchronised to form short cross bars. There is usually a tinge of orange on the neck and the tail tip. The base of the tongue is red.

SYSTEMATIC ACCOUNT

HEMIRHAGERRHIS VIPERINA (Bocage 1873)

viperine rock snake (Figures 1, 3A, 4, 5, 6 & 7)

Psammophylax rhombeatus? Bocage, 1867: 224.

Psammophylax viperinus Bocage, 1873: 222. Type locality: "Dombe" = Dombe Grande, Benguela, Angola.

Psammophylax nototaenia Bocage, 1895: 109.

Amplorhinus nototaenia Boulenger, 1896: 125 (part); Sternfeld, 1910a, 23 and 1910b: 55; Werner 1925: 131 (part); Lawrence, 1929: 26; Monard, 1937: 126, 128; FitzSimons, V., 1938: 157.

Hemirhagerrhis nototaenia viperinus Bogert, 1940: 75, Fig. 12A, 13 & 15E; FitzSimons, V. 1962: 208; Laurent, 1964: 112; FitzSimons, V., 1966: 63 & 1970/74: 125/126; Broadley, 1983: 120; Bauer *et al.*, 1993: 135.

Hemirhagerrhis nototaenia viperina Mertens, 1955: 92 & 1971: 85; Elzen, 1980: 399, Fig. 2.

Description: Snout blunt; rostral much broader than deep, just visible from above; internasals much shorter than prefrontals; frontal narrowed mesially, about twice as long as broad, longer than its distance from end of snout, subequal to a parietal; loreal longer than deep; nostril pierced vertically in a semi-divided nasal; preocular just reaching or failing to reach frontal; postoculars 2 (rarely 3); temporals usually 2+3, sometimes 1+3, rarely 1+2 or 2+2 (Table 2); supralabials 8, the fourth and fifth entering the orbit; infralabials usually 10, rarely 11 or 9 (Table 2), the first 5 (rarely 4) in contact with the anterior sublinguals, which are subequal in length to the posterior. Dorsal scale rows smooth in 17-17-13 rows, reducing by loss of lateral rows only; ventrals 154-177; anal divided; subcaudals 52-66 (Table 1), without sexual dimorphism.

Colouration: The ground colour varies from pale buff (Fig. 4, 6) to dark grey (Fig. 5) and the dorsal markings vary from brown to black. These may consist of two rows of staggered blotches Fig. 3A, a zig-zag line bisected by a thin yellow vertebral line (Fig. 7) or the blotches more or less synchronised to form crossbands as in *H. nototaenia* (Fig. 5). The head is pale above except for some sparse darker stippling, there is no dark stripe through the eye, only some dark blotches and streaks on the supralabials (Fig. 1). The ventrum is always paler than the dorsum, with sparse stippling.

Size: Largest ♂ (TMP 45175 - Tundavala to Sa da Bandeira, Angola) 337+77 = 414 mm. Largest ♀ (CAS 175097 - Farm Franken, northern Damaraland, Namibia) 407+85 = 492 mm. Tail .17-.21 per cent of total length.

Ecology: This is a rupicolous species. Wulf Haacke supplied habitat data for three Angolan specimens: TM 40101 amongst rocks on overgrown black amphibolite outcrop, associated lizards were *Agama planiceps*, *Rhoptropus barnardi* and *Cordylus vittifer machadoi*; TM 45175 found under flake of granite on boulder on a wooded slope; TM 46736 collected at ca. 16h00 in the sun on top of a granite boulder. The association of this species with rocky habitats is confirmed by FitzSimons (1938), Elzen (1980) and Bauer *et al.* 1993. Bogert (1940) recorded a small *Mabuya quinquetaeniata* in the stomach of a Hanha specimen, but as this skink does not occur in Angola, it is more likely to have been another blue-tailed rupicolous species *Mabuya laevis*.

Distribution: Southwestern Angola and northwestern Namibia (Fig. 10, 11).

LOCALITIES

Angola: Capangombe (Bocage, 1895) MB 1716(2); 5 km S of Chibemba TMP 40101; Caraculo TMP 22517, 46736; Dombe Grande (Bocage, 1867, 1873, 1895) MB 1715 (type); Hanha (Bogert, 1940); Huambo (Bogert 1940) AMNH 50506; Humpata (Laurent, 1964); Huxe BMNH 1906.8.24.75; Lungo TMP 24420; Maconjo (Bocage, 1895) MB 1714 (2); Munhino (Bogert, 1940) AMNH 50509-10; 8 km from Tundavala to Sa da Bandeira TMP 45175.

Namibia: no locality (Mertens, 1955) TMP 38234; Brandberg SMWN 3195, 8047; Epupa Falls TMP 47720; Erongo Mts SMWN 2364; Etemba TMP 66779; Fran-ken (Bauer *et al.*, 1993) CAS 175094, 175097; Gobabis (Sternfeld, 1910b); Kamanjab (Bauer *et al.*, 1993) SMWN 2365 & 62 km ESE CAS 193659; Karossfontein NMZB 12220; SMWN 8048; Lichtenau TMP 57937; Omandumba West (Elzen, 1980); Omaruru (Mert., 1955a); Paderborn (Bauer *et al.*, 1993); Ruacana Falls SMWN 2670.

Unknown origin: ("Griffin Mine, Leydsdorp, Transvaal") TMP 5316.

HEMIRHAGERRHIS NOTOTAENIA (Günther)

bark snake (figure 2, 3B, 8 & 9)

Coronella nototaenia Günther, 1864: 309, pl. xxvi, fig. 1. Type locality: "Rios de Sena, Zambezi", Mozambique. *Ablabes Hildebrandii* Peters, 1878: 205, pl. ii, fig. 6. Type locality: Kitui, Kenya.

Amphiophis nototaenia Boulenger, 1891: 307.

Hemirhagerrhis nototaenia Stejneger, 1893: 730.

Psammophylax nototaenia Bocage, 1895: 109.

Amplorhinus nototaenia Boulenger, 1896: 125 (part) and 1897: 801; Boettger, 1898: 99; Hewitt, 1913: 481; Boulenger, 1915: 629; Werner, 1925: 131 (part); Loveridge, 1933: 250; Pitman 1934: 296; FitzSimons, 1935: 314.

Amplorhinus Güntheri Mocquard, 1906: 251. Type locality: "Environs du lac Ugami, l'Afrique australe". (error for Ugami, east Africa, vide NMHN catalogue).

Hemirhagerrhis nototaenia nototaenia Bogert, 1940: 73; Loveridge, 1951: 192, 1953: 269 and 1955: 185; Witte, 1953: 226, Fig. 74; Vesey-FitzGerald, 1958: 57; Broadley,

1959: 41; Broadley & Pitman, 1960: 443; Broadley, 1962: 832; FitzSimons, 1962: 206, fig. 56, pl. xxxiv; Johnsen, 1962: 123; Wilson, 1965: 161; FitzSimons, V., 1966: 63; Visser, 1966: 22, pl. 54; Bourgeois, 1968: 149, Fig. 62-64; FitzSimons, V., 1970/74, pl. 125; Broadley, 1971: 83, pl. x; Broadley & Cock., 1975: 75, pl. 33; Broadley & Blake, 1979: 11; Broadley, 1983: 118, fig. 71, pl. xxiii; Auerbach, 1987: 161, pl. 15/4; Broadley, 1988: 392; Broadley & Howell, 1991: 27.

Description: Snout blunt; rostral much broader than deep, just visible from above; internasals much smaller than prefrontals; frontal narrowed mesially, about twice as long as broad, longer than its distance from the end of the snout, subequal to a parietal; loreal longer than deep; nostril pierced dorsolaterally in a semi-divided nasal; preocular not in contact with frontal; postoculars 2; temporals 1+2, very rarely 1+3, 2+3 or 2+2 (Table 2); supralabials 8, very rarely 7 or 9, the fourth and fifth (very rarely third and fourth or fifth and sixth) entering the orbit; infralabials 9, rarely 10, very rarely 8 or 11 (Table 2), the first 4 (rarely 5) in contact with the anterior sublinguals, which are subequal in length to the posterior. Dorsal scale rows smooth in 17-17-13 rows, reducing by loss of lateral rows only; ventrals 153-179; anal divided; subcaudals 68-90 (Table 1), without sexual dimorphism.

Colouration: Ash-grey to grey-brown above and below; top of head blackish, continuing as a vertebral stripe about three scales wide, jet black on the neck but fading posteriorly, a row of black spots merges with the vertebral stripe on either side, usually opposed to form crossbars, rarely alternating to form a zigzag. A dark lateral streak on the head passes through the lower two-thirds of the eye and fades out on the neck, being replaced by a row of grey lateral spots (Figs. 2, 8 & 9), usually a tinge of orange on the nape and tail tip.

Size: Largest ♂ (JPT Coll. - Morera, Mozambique) 300+95 = 395 mm. Largest ♀ (JPT 1346 - Matchova, Mozambique) 335+97 = 432 mm (tail tip missing). Tail .22-.29 percent of total length.

Ecology: This is a semi-arboreal species which inhabits dry savanna at altitudes up to \pm 1 200 metres. It is sometimes found under loose bark or in hollow trees, especially Mopane (*Colophospermum mopane*). The diet consists largely of small geckos (including *Lygodactylus capensis*, *Pachydactylus punctatus* and *Hemidactylus mabouia*), but skinks (*Mabuya striata*) are also taken. Hoervers & Johnson (1982) recorded predation on the eggs of *Hemidactylus platycephalus* by a population of *H. nototaenia* living on Acacia trees at Chisimaio on the Somali coast.

Predation by *Agama atricollis* has been recorded in Zambia. Four to eight eggs are laid at a time.

Distribution: Tropical East Africa from southern Sudan and Somalia southwards to Mozambique and the eastern Transvaal, west to southern Zaire, Zambia, eastern Namibia (Caprivi) and Botswana, it probably occurs in

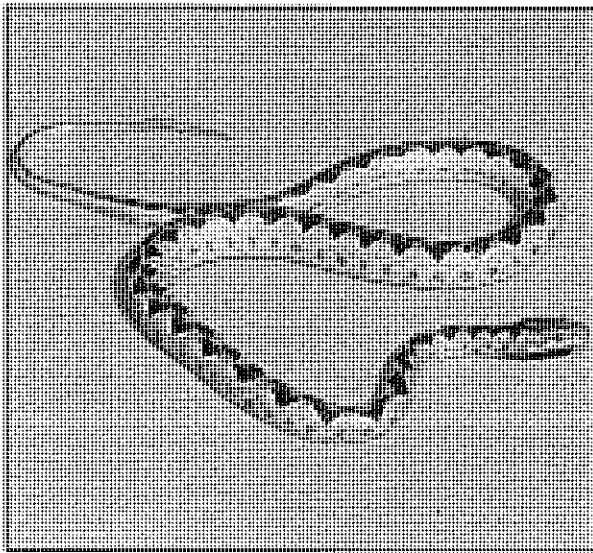


FIGURE 4: *Hemirhagerrhis viperina*, TMP 46736 - Caraculo, Angola.

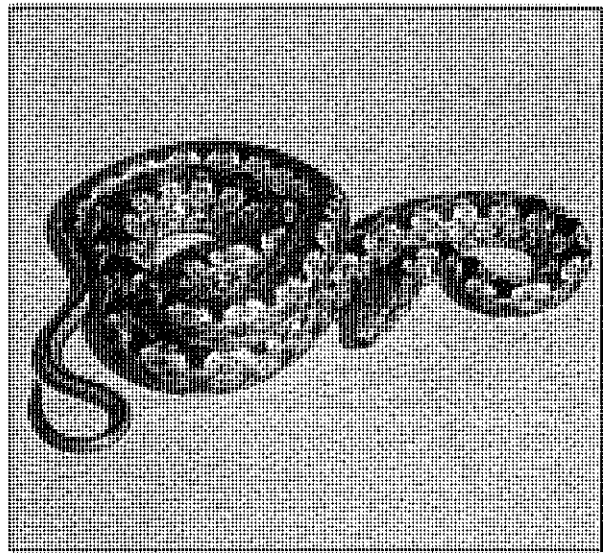


FIGURE 5: *Hemirhagerrhis viperina*, TMP 40101 - 5 km S of Chibemba.

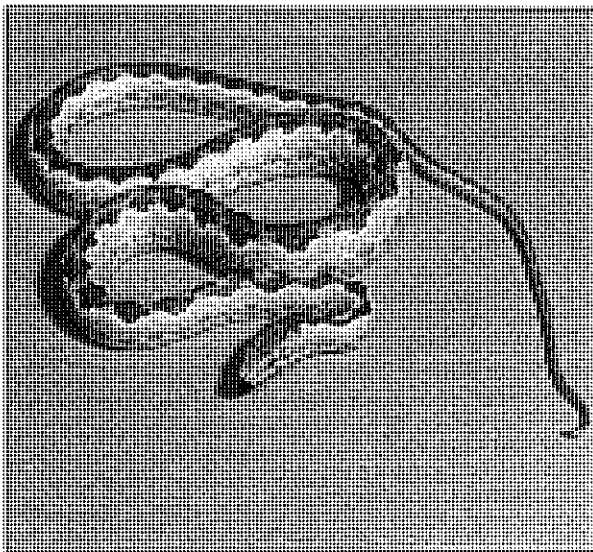


FIGURE 6: *Hemirhagerrhis viperina*, TMP 47720, Epupa Falls, Kaokoveld, Namibia.

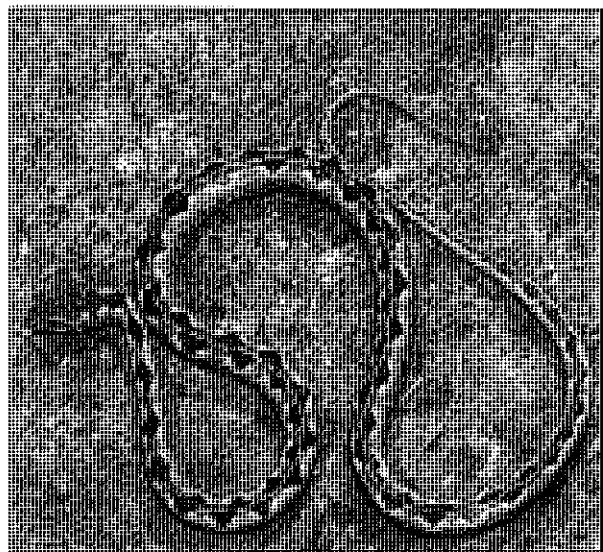


FIGURE 7: *Hemirhagerrhis viperina*, SMWN 8048 - Kurossfontein, Namibia.

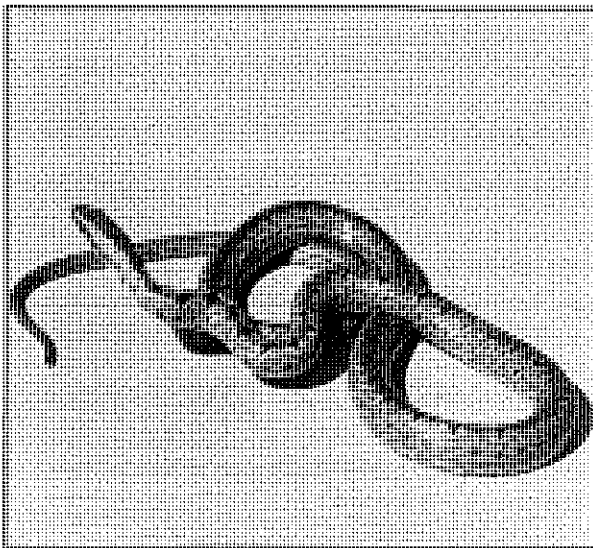


FIGURE 8: *Hemirhagerrhis nototaenia*, eastern Transvaal.

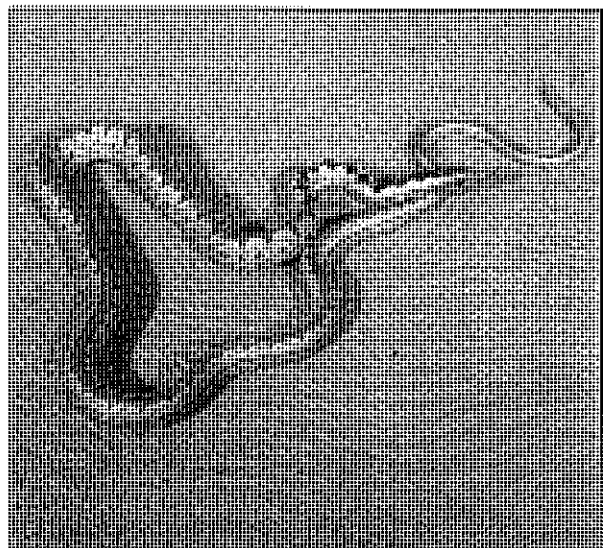


FIGURE 9: *Hemirhagerrhis nototaenia*, Zimbabwe.

south-eastern Angola (Figs. 10 & 11). Roman (1980: 75) recorded a *Hemirhagerrhis* from Diapaga in south-east Burkina Faso with 155 ventrals and 55 subcaudals and noted that he had also examined a live specimen from near Kandi in northern Benin. These records are separated from the nearest records of *H. nototaenia* in southern Sudan by 2 400 km and may represent an undescribed short-tailed species. These localities are indicated by question marks in Fig. 11.

LOCALITIES

Namibia (Caprivi): Katima Mulilo SMWN 6846, 8092 and 15 km WSW NMZB-UM 21301; Lianshulu SMWN 7811.

Botswana: Francistown NMZB-UM 10481; Kabulabula (FitzSimons, 1935) TMP 14696; Kasane NMZB-UM 13354; Makalamabedi NMZB-UM 16181; Selebi-Pikwe (?) SAM 45485; Tsodilo Hills NMZB-UM 16198; SAM 43882; Tsotsoroga Pan (FitzSimons, 1935) FMNH 17723.

Zimbabwe: Beitbridge NMZB 358; Birchenough Bridge NMZB-UM 4705, 7499, 23871, 28351-2, 32942; Chiredzi FMNH 205870; NMZB-UM 8519, 13411, 19752, 29399; Chimanimani Hot Springs NMZB-UM 19167; Chinhoyi Caves AJL 171; Chipangayi Bridge NMZB-UM 27416; Chipinda Pools NMZB-UM 31625; 65 km NE of Chirundu NMZB 377; Chitora River NMZB-UM 28634; Condo NMZB 4168; Devon, Odzi River NMZB 675; Dorowa NMZB-QVM 390; Fishan, Gonarezhou Nat. Park NMZB-UM 4936; Gwanda NMZB 7102, 8908; Humani Ranch NMZB-UM 29209; Hwange National Park NMZB-UM 29627; Inyokene NMZB 9719, 11332; Kapami NMZB-UM 853; Kariba NMZB 3224; NMZB-UM 2744, 5167, 11629, 11744-5, 11893, 23684, 24151, 32624; Kariba Lake - Charara Confluence NMZB-UM 5166, 5343 & Sinamwenda NMZB 9349; Karoi NMZB-UM 21415; Kazuma Pan NMZB 11059; Kwekwe SPQ 111; Lupane NMZB 31849; Majoda NMZB 8979; Malapati Drift NMZB-QVM 167; Mana Pools NMZB-UM 5560; Marhumbeni NMZB 2303; Mashumbi Pools NMZB 10435; Matetsi (Hewitt, 1913) NMZB 1170; Mount Darwin NMZB-UM 32; Mzarabani West NMZB 8830; Nyanyadzi NMZB-UM 23070, 23785; Rupisi Hot Springs NMZB-UM 27871; Ruware NMZB-UM 5834; Sanyati Gorge NMZB 3586, 3603-4; Sengwa Research Station NMZB-UM 22791; Shashe-Limpopo Confluence NMZB-UM 13140; Shashe - Shashani Confluence NMZB-UM 5707; Siakobvu, Bumi River NMZB-UM 18298; Tivuli Spring, Binga NMZB-UM 10576; Tuli NMZB 3225; Victoria Falls NMZB 13365; Whitewaters NMZB-UM 17866.

Zambia: Chipangali NMZB-UM 17315-6; Chunga NMZB-UM 30038, 30053; Kabompo NMZB 1308; Kalichero NMZB-UM 2763; Kaniki NMZB-UM 682-3, 685; Kasuru NMZB 3273, 4259; Lochinvar NMZB-UM 693; Lubungu Pontoon NMZB-UM 4520; Lundazi NMZB-UM 2762; Lusaka East NMZB-UM 1694; Mbala (Vesey-FitzGerald, 1958) NMZB 1548; Mpika District (Pitman, 1934); Mporokoso NMZB 1549; Mufuwe Lagoon NMZB-UM 5991; Mukupa IRSNB

2561; Mweru-Wantipa (Vesey-FitzGerald, 1958); Namwala Dist. (Pitman, 1934); Ndola (Johnsen, 1962); Ngoma NMZB-UM 18059; Nyamkolo (Loveridge, 1933); Rukuzi Dam NMZB-UM 3104; Siantamba NMZB 3452, 3778; Simamba NMZB 3450-1.

Malawi: Cape McLearn (Boulenger, 1891); Lake Malawi (Boulenger, 1891); Chitipa = Fort Hill (Boulenger, 1897).

Mozambique: Alves de Lima NMZB-UM 27001; Boroma (Boettger, 1898); Canganetole CM 40444-8; NMZB-UM 29120; Maforga NMZB-UM 7110; Malanguene NMZB 29094; Matchova JPT 1346; 1376; NMZB-UM 28917; Metambanhe NMZB-UM 9314; Miquia NMZB-UM 30663-4; Morera JPT -; Muabsa JPT -; Rios de Sena (Günther, 1864); Tec-Tec NMZB-UM 29130; Xiluvo NMZB-UM 7151, 7244; Zinave NMZB-UM 30662; JPT 1092-3, 1193.

Tanzania: Kitungulu (Loveridge, 1933); Liwale FMNH 81672-4; NMZB 151, 186, 206-7, 539(2); Mahenge NMZB-UM 6564-5; Nachingwea FMNH 78238-42; Rukwa Valley (Vesey-FitzGerald, 1958).

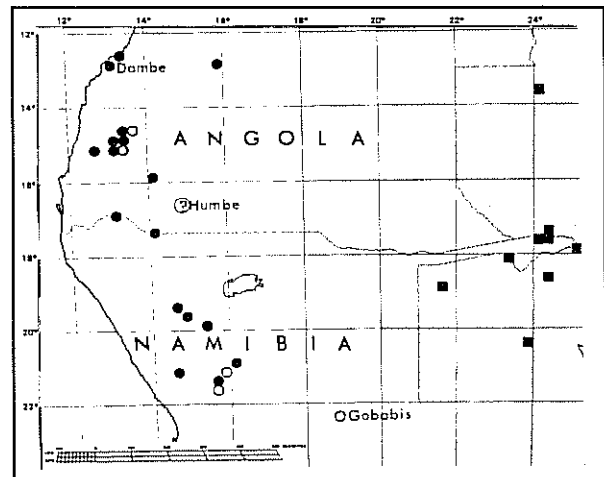


FIGURE 10: Distribution of *Hemirhagerrhis viperina* (circles) and adjacent records of *Hemirhagerrhis nototaenia* (squares), by quarter degree squares.

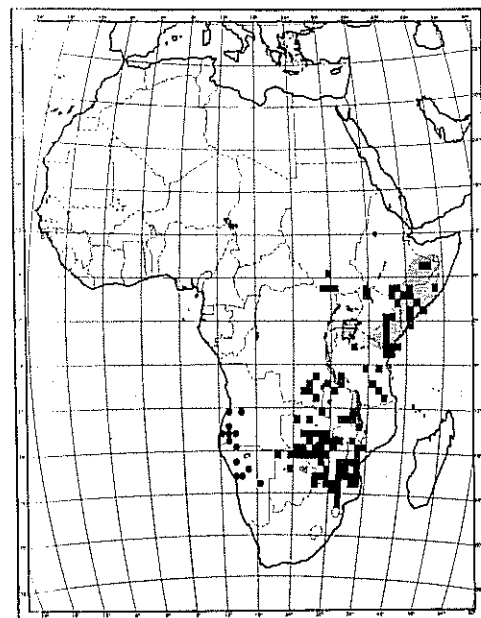


FIGURE 11: Distribution of the genus *Hemirhagerrhis*: *H. viperina* (circles) and *H. nototaenia* (squares) plotted by degree squares, also *H. kelleri* (stippled).

KEY TO THE GENUS *HEMIRHAGERRHIS*

- 1a. Dorsum with a broad black-bordered vertebral band; ventrum with paired brown longitudinal lines; ventrals 144-155 *H. kelleri*
- 1b. Dorsum without a broad black-bordered vertebral band; ventrum with dark speckling; ventrals 153-183 2
- 2a. Ventrums paler than dorsum; subcaudals 52-66; rupicolous *H. viperina*
- 2b. Ventrums dark grey like dorsum; subcaudals 68-105; semi-arboreal *H. nototaenia*

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