

Somali Boidae (genus *Eryx* Daudin 1803) and Pythonidae (genus *Python* Daudin 1803) (Reptilia Serpentes)

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Data on nomenclature, taxonomy, morphology, geographical distribution and natural history of Somali Boidae [the three monotypic species *Eryx colubrinus* (Linnaeus 1758), *Eryx somalicus* Scortecci 1939 and *Eryx borrii* n. sp.], and Pythonidae [the monotypic species *Python sebae* (Gmelin 1788)].

KEY WORDS: Boidae, Pythonidae, *Eryx*, new species, *Python*, Somalia.

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INTRODUCTION

The present paper concerns the taxonomy and biology of the python and the three species of sand boas occurring in the Somali Democratic Republic, one of them new to science.

Though *Python sebae* is one of the best known African snakes, we deemed it essential to give a detailed account of its biology, until now confused with that of the recently resurrected *Python natalensis* A. Smith 1840, a species widely distributed in southern and eastern Africa and locally sympatric with *P. sebae* in Kenya and Tanzania. However we also deal rather extensively with the biology of *Eryx*, for which the data are scattered in several, not easily found contributions.

MATERIAL AND METHODS

We have studied 79 specimens of *Eryx colubrinus* (Linnaeus 1758), 8 specimens of *Eryx somalicus* Scortecci 1939, 1 specimen of *Eryx borrii* n. sp., and 14 specimens of *Python sebae* (Gmelin 1789).

For the study of variability we also utilized data found in the literature or provided by colleagues.

The drawings were made from photographs under the supervision of the senior author.

The describing the dentition we used the following two useful but poorly known terms proposed by WALL (1921): anodont, «An uninterrupted series of teeth», and scaphiodont, «Decreasing in length from before backwards. This type of dentition when seen in the lower jaw remains one of the shape of the bows of a ship».

Abbreviations. Institutional acronyms follow LEVITON et al. (1985): ANSP (Academy of Natural Sciences, Philadelphia, Pennsylvania, USA); BMNH [Natural History Museum, London, formerly British Museum (Natural History), London, UK]; CAS (California Academy of Sciences, San Francisco, California, USA); MCZ (Museum of Comparative Zoology, Cambridge, Massachusetts, USA); MFSN (Museo Friulano di Storia Naturale, Udine, Italy); MNHN (Muséum National d'Histoire Naturelle, Paris, France); MSNG (Museo Civico di Storia Naturale «Giacomo Doria», Genoa, Italy); MSNM (Museo Civico di Storia Naturale, Milan, Italy); MSNV (Museo Civico di Storia Naturale, Venice, Italy); MZUF (Museo di Storia Naturale, Sezione di Zoologia «La Specola», dell'Università degli Studi, Florence, Italy); NMK (National Museums of Kenya, Nairobi, Kenya, formerly Coryndon Museum); SMF (Natur-Museum und Forschungs-Institut Senckenberg, Frankfurt am Main, Germany); ZMB (Museum für Naturkunde, Universität Humboldt, Berlin, Germany).

SBS means «Spedizione Biologica in Somalia (= Biological Expedition to Somalia) dell'Università degli Studi di Firenze (years 1959 to 1970)» or «Spedizione Biologica in Somalia del Centro di Studio per la Faunistica ed Ecologia Tropicali del Consiglio Nazionale delle Ricerche e dell'Università degli Studi di Firenze (years 1971 to 1986)».

Superfamily Booidea Gray 1825

According to the different authorities, this alethinophidian superfamily includes only the family Boidae, with the subfamilies Boinae and Pythoninae (cf. DOWLING 1959), or the two families Boidae and Pythonidae; some authors also recognize the family Erycidae, which was quoted with the wrong name Erycinidae by WALLS (1998a, 1998b).

However the problems involved in Booidea phylogenesis appear to be far from being resolved (see f.i. WALLS 1998a and 1998b). We believe that it will be better to combine analyses based on morphological characters, such as those by UNDERWOOD (1976), UNDERWOOD & STIMSON (1990) and KLUGE (1991, 1993a, 1993b), with in-depth genetic research.

In the present paper we follow McDOWELL's classification (1987), which treats Pythonidae and Boidae separately, dividing the Boidae into Boinae Gray 1825 and Erycinae Bonaparte 1831:

- (i) Pythonidae Fitzinger 1826. «A supraorbital bone; anterior end of Meckelian cartilage free of dentary; palatine not independently erectile, its lateral process underlapped by an anteroposteriorly long medial process of maxilla; palatine enters infraorbital fenestra between maxilla and pterygoid; palatine tooth row (absent in *Calabaria*) continuous with that of pterygoid; rectus capitis dorsalis inserted on a transverse nuchal crest of supraoccipital; oviparous» (MCDOWELL 1987: 28).
- (ii) Boidae Gray 1825. «No supraorbital bone; tip of Meckelian cartilage enclosed by dentary; palatine erectile independently of maxilla (immobile in *Lichanura* and *Charina*, where retractor palatini muscle is lost), the medial process of the maxilla meeting only extreme rear of palatine and nearly or quite meeting pterygoid to exclude palatine from infraorbital fenestra; palatine dentition (reduced in *Lichanura* and *Charina*) set off from the pterygoid tooth row and more medially placed; rectus capitis dorsalis insertion converging medially on a sagittal crest of supraoccipital produced backward dorsal to exoccipitals (unique); live-bearing» (MACDOWELL 1987: 29).

For recapitulatory data on the taxonomy, ecology, ethology and rearing of Booidea see f.i. MINTON & RUTHEFORD MINTON (1973), STAFFORD (1986), SCHMIDT D. (1989), VOGEL (1996), WALLS (1998a, 1998b), and STÖCKL & STÖCKL (2003).

Key to the families of Somali Booidea

- 1 Top of head covered with small scales; no labial pits Boidae
- Top of head partly covered with symmetrical shields; labial pits present Pythonidae

Family Boidae Gray 1825

According to McDIARMID et al. (1999), the family includes 5 genera of Boinae (*Boa* Linnaeus 1758, *Candoia* Gray 1842, *Corallus* Daudin 1803, *Epicrates* Wagler 1830, and *Eunectes* Wagler 1830) and 3 of Erycinae (*Charina* Gray 1849, *Eryx* Daudin 1803, and *Gongylophis* Wagler 1830, here tentatively considered a synonym of *Eryx*).

Only the genus *Eryx* occurs in Somalia.

Genus *Eryx* Daudin 1803

Eryx DAUDIN 1803a: 188 [type species: *Boa turcica* Olivier 1801 (= *Anguis Jaculus* Linnaeus 1758), of the Middle East and northern Africa, by monotypy; see also ZHAO & ADLER 1993: 199 for details on the date of publication].

- Chlothonia* DAUDIN 1803b: 283 [type species: *Boa Anguiformis* Schneider 1801 (= *Boa johnii* Russell 1801) by monotypy].
- Gongylophis* WAGLER 1830 [type species: *Boa Conica* Schneider 1801 by monotypy and subsequent designation (FITZINGER 1843: 24)].
- Cusoria* GRAY 1849: 107 (type species: *Cusoria elegans* Gray 1849 by monotypy).
- Cursoria* GÜNTHER 1864: 333 (unjustified emendation of *Cusoria*).
- Eryx* TESTI 1935: 107 (typographical error).
- Erix* LIPPARONI 1954: 647 (typographical error).
- Neogongylophis* TOKAR' 1989: 54 (type species: *Anguis colubrina* Linnaeus 1758; described as a subgenus of *Gongylophis*).
- Pseudogongylophis* TOKAR' 1989: 54 (type species: *Eryx jayakari* Boulenger 1888; described as a subgenus of *Eryx*).

Derivatio nominis. The genus name derives from the Latin *Eryx* (genitive *Erycis*), the name of a mountain in the NW corner of Sicily, with a famous temple to Venus at its top; also an eponymous hero, son of Venus, defeated by Heracles in a boxing-match. According to GOTCH (1986: 128) «There is probably no special reason for this generic name» as a number of names from classical mythology has been used «without thought of any physical significance». The gender of the genus is masculine.

Content and distribution. Thirteen species in SE Europe, N and E Africa, and SW Asia to India and Sri Lanka, northward to Caucasia and Afghanistan, then eastward from Turkestan to S Mongolia and W China; the African species are *Eryx colubrinus* (Linnaeus 1758), *E. jaculus* (Linnaeus 1758), *E. muelleri* (Boulenger 1892), *E. somalicus* Scortecci 1939, and *E. borrii* n. sp.

RAGE (1972) and TOKAR' (1989) proposed revalidation of the genus *Gongylophis* Wagler 1830, an opinion not shared by UNDERWOOD (1976), RIEPPEL (1978) and SZYNDLAR & SCHLEICH (1994). According to TOKAR' (1989) in this genus the medial crest of the pterygoid, relatively small, merges into its dentigerous process and the palatine bears 5-6 teeth, while in *Eryx* the relatively large medial crest ends abruptly close to the origin of the above-mentioned process and the palatine bears 4-5 teeth. The Russian author (1989, 1995, 1996) includes in *Gongylophis* the species *colubrinus* (Linnaeus 1758), *conicus* (Schneider 1801), *muelleri* Boulenger 1892, and *whitakeri* Das 1991; in *Eryx* the species *elegans* (Gray 1849), *jaculus* (Linnaeus 1758), *jayakari* Boulenger 1888, *johnii* (Russell 1801), *miliaris* (Pallas 1773), *somalicus* Scortecci 1939, *tataricus* (Lichtenstein 1823), and *vittatus* Chernov 1959. Instead, according to SZYNDLAR & SCHLEICH (1994: 235) «as evidenced by their caudal osteology, the living members of *Eryx* form two distinct groups: (1) the Afro-Arabian complex including *E. jayakari*, *E. somalicus*, and *E. muelleri*, characterized jointly by strongly reduced haemapophyses, the condition considered apomorphic; (2) the Euroasiatic complex including the remaining species (perhaps also the African *E. colubrinus*), with well developed haemapophyses (Z. SZYNDLAR unpubl.)». According to KLUGE (1993a: 293) «Further resolution of *Eryx* species relationships is required before *Gongylophis* (type species *conicus*) can be recognized». In the present paper we prefer to follow LARGEN & RASMUSSEN (1993) in adopting the classical view and retaining the name *Eryx* for both species of sand boas occurring in NE Africa.

Three species in Somalia: *Eryx colubrinus*, *Eryx somalicus* and *Eryx borrii* n. sp.

Fossils. Subfamily Erycinae appeared perhaps during the late Cretaceous (Mesozoic era) and was extremely common during the Cenozoic era (RAGE 1987). According to SZYNDLAR & SCHLEICH (1994: 235) the erycine snakes «were widespread

in the Palaeogene [Cenozoic era] of both Old and New World, but fossil finds of the living genus *Eryx* have never been reported from pre-Miocene times» perhaps with the only exception of a skull of *Crythiosaurus* from the Mongolian Oligocene (Palaeogene period), originally described as an amphisbaenid. True *Eryx* are known to have been widely distributed in the Mediterranean and Black Sea areas between the end of the lower Miocene and the late Pliocene (Neogene period). Messinian (late Miocene) remnants, probably belonging to *Eryx*, have been described from near Alba (Piedmont) by CAVALLO et al. (1993). The available fossil remains suggest that most representatives of *Eryx* inhabiting Europe in the past were similar to the recent Asiatic members of the genus, except for one or two *taxa* from S Spain (*Eryx primitivus* Szyndlar & Schleich 1994, middle Pliocene; *Eryx* aff. *primitivus*, middle/late Pliocene) belonging to the Afro-Arabian complex, displaying primitive conditions in their caudal osteology and probably representing an early offshoot of a hypothetical ancestral stock leading to the extant species of *Eryx*. According to HOLMAN (1998), *E. jaculus* is only known from the Pleistocene (Quaternary period) of Europe [Greece: Chios Is. (Middle Pleistocene) and Kos Is. ("Upper Quaternary")]. For fossil erycine snakes see also KLUGE (1993a) and RODRÍGUEZ-ROBLES et al. (1999).

Description. Size small to rather large: greatest adult total length from about 40 cm, e.g. in *E. elegans* (Gray 1849), to a little more than 1 m as in *E. johnii* and *E. tataricus*, according to SEUFER (2001). Head not or scarcely distinct from the neck; body cylindrical, stout; tail short, thick, conical or terminating in a sharp point, not or, very slightly prehensile. Eye small or very small, with vertical pupil. No labial pits. Head covered with small, irregular, smooth scales (except on the snout); dorsals small, numerous, smooth or keeled; subcaudals entire, sometimes some of them divided; anal single, only exceptionally divided. Mental groove present or absent. No chin shields. Hemipenis extending to ventral 8 to 14 when retracted, feebly or not bilobate, without papillae, flounced and calyculate, the sulcus spermaticus forked or undivided. Skull and muscles: prefrontals widely separated; nasals broad posteriorly, clearly longer than frontals; palatine mobile, strongly toothed, its choanal process reduced; retractor arcus palatini present (palatine scarcely mobile, weakly toothed, its choanal process large, and no retractor arcus palatini in the North American Erycinae *Lichanura* and *Charina*). Maxillary and mandibular teeth numerous, solid, ungrooved, arranged in an anodont and scaphiodont set (only the first tooth sometimes a little shorter than the second). ALEXANDER & GANS (1966) found in *E. colubrinus* (n = 2), *E. conicus* (Schneider 1801) (n = 1) and *E. jaculus* (n = 2) the following combined data: 168(?)–188 (ventral) and 254–278 (dorsal) body scale rows, ca 18–28 (ventral) and ca 18–28 (dorsal) caudal scale rows, 174–190 body vertebrae, 19–29 tail vertebrae; the dermal-vertebral ratios of the three species turned out to be: body (ventral 1:1; dorsal 1.4:1), caudal (ventral 1:1; dorsal 1.0–1.1:1).

Biology (see also *Eryx colubrinus*, Biology). Terrestrial, fossorial or semifossorial, predominantly crepuscular and nocturnal snakes inhabiting arid and sub-arid regions, usually not strictly linked to sand substrata, notwithstanding their common name; they are able to disappear very quickly into the sand where they creep just beneath the surface. According to VAN WOERKOM (1987: 49) «a furrow along the middle of the back and, sometimes, strongly keeled scales prevent the sand from sliding off their backs and showing their presence». Sand boas may be found above the ground during the night or at twilight, hiding by day under stones, in soil crevices, in burrows or under the sand; occasionally they are active on the

surface also by day, especially with overcast sky. According to STAFFORD (1986: 106), the sand boas «are able to tolerate wide extremes of temperature and can withstand long periods of drought»; hibernation and/or estivation takes place in loose sand, burrows, termitaria, crevices or beneath rocks. The genus occurs from sea level to the high mountains; e.g., according to SEUFER (2001), *E. miliaris* and *E. elegans* are known to reach about 1800 m and more than 2500 m a.s.l., respectively.

Very voracious animals, the sand boas dispatch their prey by means of constriction or squeezing against hard objects, but nestlings of small birds and mammals may be swallowed alive; according to POLS (1986; Kenyan specimens of *E. colubrinus*) relatively small prey are grasped very quickly and suffocated not by constriction but by pulling them under the sand. Sand boas usually hunt by lying in ambush under the sand, with only the eyes and nostrils above the surface, or in any case remaining in a hidden position; but when the prey is within striking distance, they grasp it by projecting themselves from their hiding place. In any case, according to RODRÍGUEZ-ROBLES et al. (1999), since nestling birds and rodents are necessarily sedentary, erycines must encounter those prey by wide-foraging rather than ambush. RODRÍGUEZ-ROBLES et al. (1999: 49), dealing with the diet of Erycinae (a basal clade of macrostomatan snakes, i.e. snakes characterized by increased mobility of the jaws and increased gape size) stated that «species of *Eryx* feed mainly on mammalian prey, but also eat lizards and occasionally birds. Evolutionarily more basal groups of snakes primarily feed on elongate prey, which suggests that innovations of feeding apparatus of macrostomatans allowed these snake to eat heavier and bulkier prey, particularly mammals. Erycines appeared and diversified at approximately the same geological time as rodents, suggesting that rodents perhaps constituted an abundant prey resource that favoured the diversification of early macrostomatans». Exceptionally *Eryx* feeds even on reptile eggs or invertebrates, mainly slugs (KLINGELHÖFFER 1959). The prey may also be relatively large; e.g., J.N.B. BROWN found in the stomach of a 38 cm long *E. jayakary* a jerboa with a total length of 28 cm (JONGBLOED 2000).

While generally sluggish, sand boas are quick to bite, seizing their prey in sudden sidelong strikes. Towards man they are either docile or aggressive depending on the circumstances; when handled, their attack may result in deep lacerations due to a very rapid series of lateral slashing bites; captive specimens are eventually inclined to become very tame and even to accept food by hand. Although their bite is innocuous, at least some species of *Eryx* (*E. colubrinus* included) have saliva containing powerful poisons, though in minute quantities (CORKILL 1935).

The tail may be used to deflect attention away from the head when the snake is under threat (MATTISON 1995).

Sand boas reproduce by ovoviviparity; captive animals copulate in spring and early summer; the male tries to dig the posterior half of the female out of the sand prior to copulation; the female sometimes refuses all food during pregnancy; 4-17 young are born within 4 to 5 months, with a length varying approximately between 120 and 290 mm according to the species; the first slough takes place between 7 and 16 days after birth (LAMERS 1984, VAN WOERKOM 1987, SHARP 1992, TRACER 1996, SPAWLS et al. 2002). Little is known about the time necessary to reach sexual maturity; KEND & KEND (1993), dealing with rough-scaled sand boas (*E. conicus*), stated, with no further details and perhaps on the basis of information gleaned from published reports, that, if fed well, they reach sexual maturity in about two to three years, although it is possible for 18-month-old specimens to reproduce (see also *E. colubrinus*, Biology). Some data on the growth rate of

captive *E. colubrinus* (see below), *E. jaculus* and *E. johnii* have been given by VAN WOERKOM (1987).

Data on the rearing of sand boas, some of them including *E. colubrinus*, can be found in KLINGELHÖFFER (1959), MATZ (1974), VAN WOERKOM (1981), McLAIN (1982), BARTLETT (1984), GRIFFITHS (1984), LAMERS (1984), DATHE (1985), KELLOUGH (1986), POLS (1986), SHARP (1992), TRACER (1996), MEER (1997), and WALLS (1998b).

Key to Somali *Eryx*

- | | | | |
|---|---|--------------------------------------|---|
| 1 | Lowest number of scales across the head from eye to eye 9-13; scales around the eye 11-16; nostril surrounded by 3 scales (internasal, prenasal and postnasal); midbody scales 43-61 | <i>E. colubrinus</i> (Linnaeus 1758) | |
| — | Lowest number of scales across the head from eye to eye 4-6; scales around the eye 9-11; nostril surrounded by 2 scales (internasal-prenasal complex and postnasal); midbody scales 34-40 | | 2 |
| 2 | 156-163 ventrals (ventrals + pseudoventrals) | <i>E. somalicus</i> Scortecchi 1939 | |
| — | Ventrals (ventrals + pseudoventrals) more numerous, 193 in the only known specimen | <i>E. borrii</i> n. sp. | |

Eryx colubrinus (Linnaeus 1758) (Figs 1-7)

Anguis colubrina LINNAEUS 1758: 228 (terra typica: Egypt; type: presumed lost).

Eryx colubrinus; DAUDIN 1803b: 261.

Eryx thebaicus REUSS 1834: 134 (terra typica: Egypt; holotype: SMF 16937).

Eryx scutata GRAY 1842: 45 (terra typica: Egypt; holotype: BMNH 1946.1.7.98, formerly BMNH IV.21.2a).

E[ryx] jaculus var. *sennaariensis* JAN 1863: 21 [terra typica: Sennaar = Sannār, 13°33'N 33°38'E, Sudan; type originally in the MSNM, lost when the museum was partly destroyed during World War II (cf. KLUGE 1993a) (synonymy *vide* BOULENGER 1893: 125) (see also JAN & SORDELLI 1864).

Eryx jaculus var. *Surinamensis* (ex errore for *sennaariensis* JAN 1863); PARENTI & PICAGLIA 1886: 61; Assab (= Aseb, 13°00'N 42°45'E).

E[ryx] tebaicus [*sic!*]; LEPRI 1911: 320.

E[ryx] i[thebaicus] thebaicus; STULL 1932: 29.

Eryx thebaicus loveridgei STULL 1932: 29 pl. II, Fig. B [terra typica: "Mbunyi" (actually Mbuyuni), Kenya; holotype: MCZ 18184].

Eryx colubrina; FLOWER 1933: 804.

Eryx rufescens AHL 1933: 324 (terra typica: Dadab, 11°N 43°15'E, Somalia; holotype ZMB 27391).

Eryx colubrinus colubrinus; STULL 1935: 406.

Eryx colubrinus loveridgei; STULL 1935: 406.

Gonygophis (*Neogonygophis*) *colubrinus*; TOKAR' 1989: 54.

Derivatio nominis. The species name derives from the Latin *colubrinus* (masculine adjective; feminine: *colubrina*; neuter: *colubrinum*); having the qualities of a snake.

Ethnozoology. *Eryx colubrinus* is widely feared in Somalia (SCORTECCI 1955) and Kenya, where, according to SPAWLS et al. (2002: 312), «it looks dangerous; [...] legend has it that if bitten, you take seven steps and die».

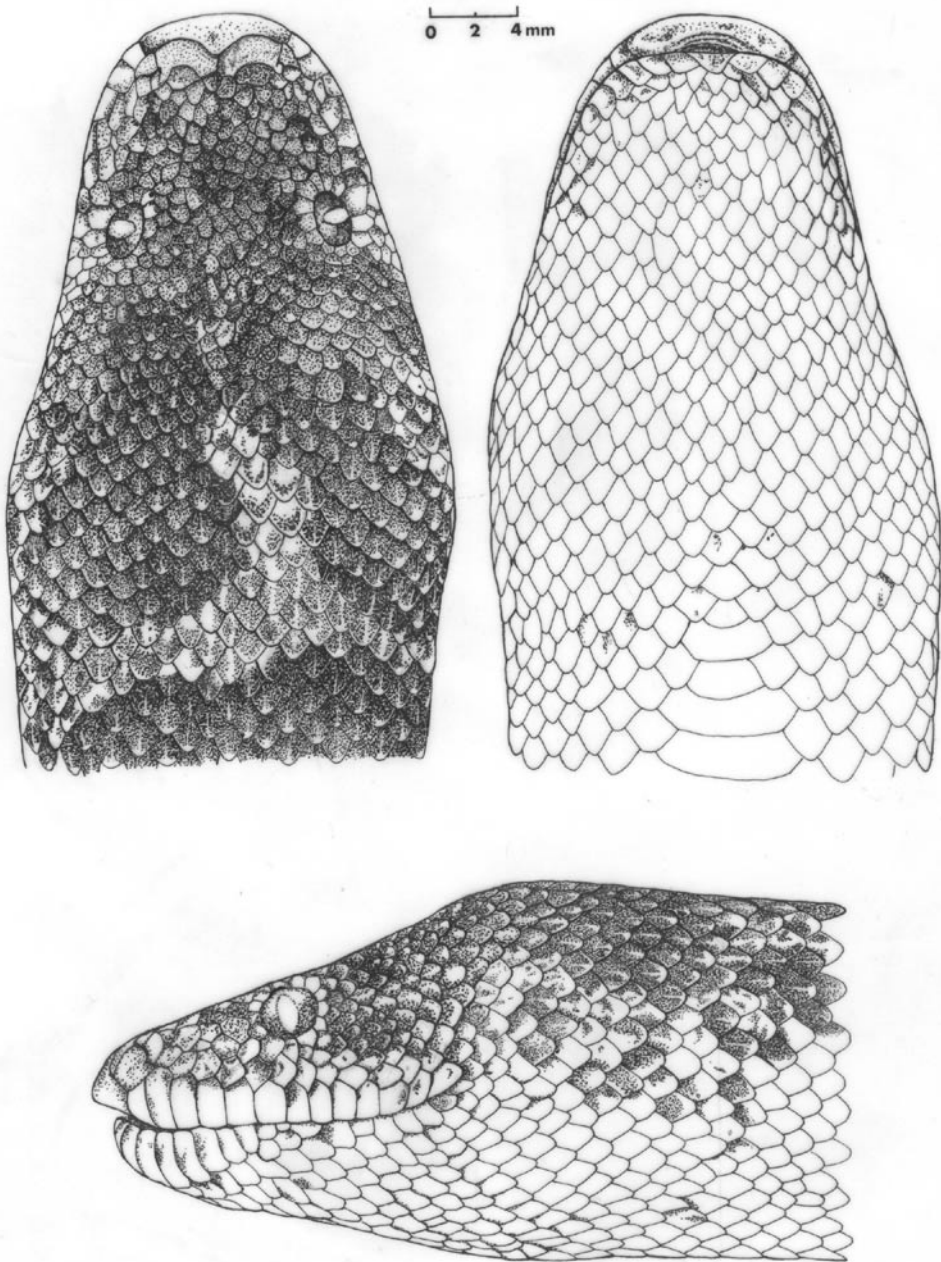


Fig. 1. — Head and neck of *Eryx colubrinus* ♀ MZUF 5943 from Afmadù; dorsal, ventral and lateral view (drawing by Manuela Mascherini).

Somali records. Afgoi (SCORTECCI 1939a: 267, 3 spec. MSNG, leg. U. Casale, 1910); Balad (SCORTECCI 1939a: 267, 2 spec. MSNG, leg. U. Casale, 1911); Bardera (BOULENGER 1909b: 311, ♀ BMNH 1909.3.29.2 and 1 spec. MSNG 40800, leg. U. Ferrandi, 1908; TESTI 1935: 107); Belet Amin (SCORTECCI 1939a: 267, 3 spec. MSNG, leg. S. Patrizi, VI-VIII.1934). Berbera (LARGEN & RASMUSSEN 1993: 326, BMNH 1929.4.29.4); Biji (BOULENGER 1901: 49, Donaldson Smith Expedition, 1899); Borama District (09°56'N 43°11'E, 1500 m) (LARGEN & RASMUSSEN 1993: 326, BMNH 1955.1.11.38, leg. Ingen); Brava (BOULENGER 1896a: 20, 1 spec. MSNG 29234, Bottego's Expedition, X.1895); Bulbar (LOVERIDGE 1936: 235, 1 spec. MCZ R 39010, leg. D. Brockman); Burao (LARGEN & RASMUSSEN 1993: 326, BMNH 1970.1606); Coastal zone of British Somaliland (the Guban) (PARKER 1949: 27, 1 spec.); Dadab (STERNFELD 1908: 239, 1 spec., Erlanger and Neumann's Expedition 1900-1901; AHL 1933: 324, 1 spec., Erlanger and Neumann's Expedition 1900-1901; LARGEN & RASMUSSEN 1993: 326 and map 7 of p. 409); Dolo (BOULENGER 1912: 331, 2 spec. MSNG 30002/1-2, leg. C. Citerni, V-VII.1911); Giohàr (SCORTECCI 1929: 269, unsexed spec. MSNM 635, formerly 2035, leg. U. Fiechter, 23.IV.1929; SCORTECCI 1931: 203, ♀ MSNM 647, formerly 2063, leg. U. Fiechter II.1930; SCORTECCI 1939a: 267, 3 spec. MSNG 42706/1-2, 3rd spec. not found, leg. A. Andruzzi, 1923; 3 spec. MSNG, leg. A. Andruzzi, III.1924; and 2 spec. MSNG 46352/1-2, leg. Paoli, 1926, or 1936?); Guban and regions south of the Shebelli River (BALLETO 1968: 255 and 267); Jumbo (BOULENGER 1909a: 309, 2 spec. MSNG 29136 and 30003, leg. G. Ferrari, VIII-IX.1908); Kismayu (LOVERIDGE 1916: 82, 1 spec. NMK/I. 129; LOVERIDGE 1936: 233, 4 unnumbered specimens NMK); Labadaad and Bulo Yaag (= Yaaq) (between) (HOEVERS & JOHNSON 1982: 184, and Hoovers' unpublished notes, 2 ♂♂ MZUF 27046-27047, field numbers LGH 609 and PMJ 106, respectively, leg. L.G. Hoovers, X.1977, and P.M. Johnson, 31.X.1977; 2 ♀♀ CAS 153326-153327, field numbers LGH

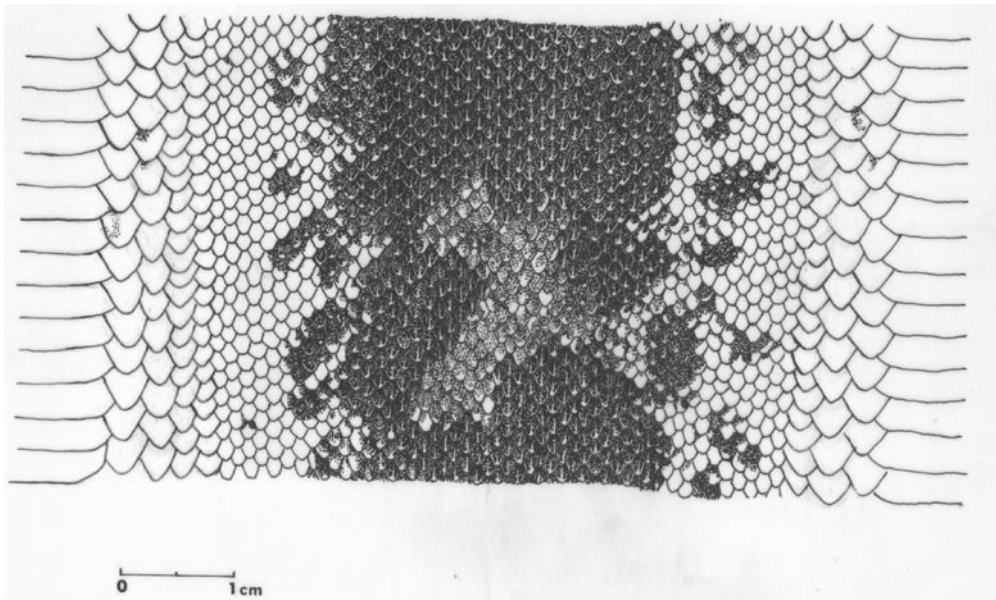


Fig. 2. — Midbody view of *Eryx colubrinus* ♀ MZUF 5943 from Afmadù (drawing by Manuela Mascherini).

571 and LGH 572, leg. L.G. Hoevers, XI.1977 and I.1979, respectively; 1 ♀ CAS 153328, field number H 0934, collected at Hargesa (= Hargeysa: 00°27'N 42°43'E), leg. L.G. Hoevers and P.M. Johnson, 26.V.1980); Meleden (northern Somalia) (SCORTECCI 1955: 647, 2 spec., one of them is the ♀ MZUF 2589, leg. G. Scortecci, 1953). Middle Shebelli River (LIPPARONI 1954: 655); Mogadishu (environs of) (LEPRI 1911: 320 and 328, 1 young spec. MZUR, leg. U. Casale; SCORTECCI 1931: 203, ♂ MSNM 643, formerly 2062/A, and ♀? MSNM 644, formerly 2062/B, leg. Luppi 1930; SCORTECCI 1939c: 128, 2 unsexed spec., Missione Biologica nel Paese dei Borana, E. Zavattari, 25.II.1937); Northern (regions West Galbeed, Togdheer, and Bari), central (regions Mudug and Galgadud), and southern (regions Middle Shebelli, Mogadishu, Bakool, Bay, Lower Shebelli, Gedo, Middle Juba, and Lower Juba) Somalia (LANZA 1983: 220; LANZA 1990: 431); Obbia and Magangib (between) (CALABRESI 1927: 31, ♀, Stefanini and Puccioni's Expedition 1924); Somalia (MOCQUARD 1888: 122, 2 spec. MNHN, Révoil's Expedition 1882-1883; SCORTECCI 1934a: 337 and unnumbered fig. of p. 338; SCORTECCI 1934b: 53 and unnumbered fig. of p. 54.; TESTI 1935: 115; SCORTECCI 1936: 923; SCORTECCI 1937: 265, 1 unnumbered fig.; SCORTECCI 1939b: 103 and 104, fig 53; BALLETO 1968: 214; WALLS 1998b: 163, unnumbered figs of pp. 164-165, 167-170, map of p. 166).

Material studied. In total, of 79 specimens have been examined from the following localities: Afgoi (♀ MZUF 1059, donated by A. Sammicheli, XII.1957; ♀ MZUF 22257, leg. A.M.



Fig. 3. — *Eryx colubrinus* ♀ MZUF 22257 from 6 km E of Afgoi (photo by Benedetto Lanza).

Simonetta, IV.1978); Afgoi (ca 6 km E of) (2 ♂♂ MZUF 24194-24195 and ♀ 24196, leg. A.M. Simonetta, 13.III.1979, summer 1979, and III.1979, respectively); Afgoi (environs of) (2 ♂♂ MZUF 1084 and 1086, leg. A. Sammicheli, XI-XII.1959; 2 ♂♂ MZUF 1085 and 1087, leg. SBS, a native, 5.IX.1959 and 25.IX.1959, respectively); Afmadù (♀ MSNM 805, formerly 2112, leg. G. Scortecci, 1931; ♀? MSNM 634, formerly 2117, leg. L. Boschis, V.1935; 2 ♂♂ MZUF 5944-5945 and 4 ♀♀ MZUF 5943, 5946-5948, leg. SBS, VIII.1970); Afmadù (ca 15 km W, close to the Lak Dere) (♂ MZUF 2021, leg. SBS, 10.VIII.1962); Alessandra Island (♂ MZUF 2190 and ♀ MZUF 2108, leg. SBS, 13-14.VIII.1962; ♀ MZUF 2238, donated by the Catholic Mission, 1962); Balàd (♀ MZUF 1060, leg. U. Funaioli, 6.IX.1954; ♀ MZUF 1083, donated by U. Funaioli, VII.1957). Bender Cassim (♀? MSNM 641, formerly 2114, leg. I. Zanetti, I.1932; ♀ MSNM 642, formerly 2113, leg. G. Scortecci, 12.IX.1931); Bud Bud (♀ MZUF 5293, leg. SBS, 12.VIII.1968); Dinsòr (2 ♂♂ MZUF 1735 and 2245, leg. SBS, 25-26.VII.1962); Dusa Marèb (ca 30 km NE) (♀ MZUF 23789, leg. A.M. Simonetta and J. Simonetta, XII.1978); Genale (♂ MZUF 1090 and 2 ♀♀ MZUF 1088-1089, donated by G. Esposito, 1959); Geribàn (♀ MZUF 39700, leg. SBS, 13.VIII.1964). Giohàr (♀ MSNM 647, formerly 2063, leg. U. Fiechter, II.1930; 2 ♀♀ MSNM 718-719, formerly collective number 2115, leg. U. Fiechter, VII-VIII.1933; unsexed spec. MSNM 635, formerly 2035, leg. U. Fiechter, 23.IV.1929); Giohàr (10 km NW) (♀ MZUF 2237, leg. SBS, A.M. Simonetta, 19.VIII.1962); Giohàr (8 km SW) (♀ MZUF 5374, leg. SBS, 12.IX.1968); Jamame (♀ MZUF 3945, leg. SBS, 1964); Jilib (2 ♂♂ MZUF 21641, 22011 and 2 ♀♀ MZUF 22008, 27652, donated by G. Tarabini Castellani, 1970, No. 21641, 1977, No. 22008, 22011, and 1980, No. 27652); Kismayu (♂ MZUF 6934, donated by Todaro and Lapucci, 1971); Labadaad (00°30'N 42°46'E) and Bulu Yaag (00°12'N 42°46'E) (= Yaaq) (between) (2 ♂♂ MZUF 27046-27047, field numbers LGH 609 and PMJ 106, respectively, leg. L.G. Hoevers, X.1977, and P.M. Johnson, 31.X.1977); Lak Badanà (ca 10 km WSW of Mangab) (♂ MZUF 3959, leg. Lucano, 9.IX.1964); Mahaddei Wen and Avai (between) (♂ MZUF 21965 and 2 ♀♀ 21881-21882, leg. Fagotto, ca 1975); Meledèn (♀ MZUF 2589, leg. G. Scortecci, 1953); Mogadishu (unsexed spec. MSNM 648, leg. Onorio Govinidi?, undecipherable, 1936; 3 ♂♂ MZUF 2804-2806 and 1 ♀ MZUF 2803, donated by B. Lanza); Mogadishu (environs) (♂ MSNM 643 and ♀? MSNM 644,



Fig. 4. — *Eryx colubrinus* ♂ MZUF 28538 from Xayo (ca 80 km SW of Afmadù) (photo by Marco Borri).

formerly collective number 2062, leg. Luppi 1930; ♂ MSNM 645 and ♂? MSNM 646, formerly collective number 2116, leg. Confalonieri, 1935; 3 ♂ MSNM 636, 638-639 and unsexed spec. MSNM 637, formerly collective number 2111, leg. G. Scortecci, X.1931); Obbia and Magangib (between) (♂ MZUF 979, leg. G. Stefanini and N. Puccioni, 1924); Oddùr (♂ MZUF 23759, ♀ MZUF 23760 and unsexed spec. MZUF 23758, leg. Marescotti, 1956, donated by the Istituto di Zoologia, University of Genoa). Scialambòd (1 ♀? MSNM 640, ex 2110, leg. Urbinati brothers, 1930); Somalia (♂ MZUF 33637, leg. SBS, 1964?). Tessenei (extralimital: Eritrea) (2 ♀♀ MSNM 632-633, formerly collective number 2217, leg. A. Remedelli, donated by the Istituto Sieroterapico Milanese, summer 1937). Uagadi (♂ MSNM 631 and 2 ♀♀? MSNM 629-630, formerly collective number 2109, leg. Urbinati brothers, 1930). Warmahàn (♀ MZUF 24197, leg. A.M. Simonetta, 27.I.1979); Warshèk (environs of) (♂ MZUF 27529, leg. A.M. Simonetta, 5.IX.1983); Xayo (ca 80 km SW of Afmadù) (♂ MZUF 28538, leg. SBS, Marco Borri, 30.X.1983).

Description (Figs 1-6; see also Geographical variability).

Morphology. Dorsal head scales small and smooth, imbricate, only the nasals and internasals enlarged; rostral large and broad, about 2.5 times wider than high, with a labial angular horizontal edge; nostril surrounded by 3 scales (a large internasal, a medium-sized prenasal and a slightly smaller postnasal); 9-15 interorbital (usually 10-12) and 11-16 (usually 13-14) circumorbital scales; eye separated from the labials by 1-3 rows of scales, usually 2; 4-7 scales between the nasal and the eye, usually 5; 11-15 supralabials, usually 13-14; approximately 19-21 small lower labials; 13-23 scales between the mental and the first pseudoventral, usually 15-17; mental groove absent or, according to BOULENGER (1893) and ANDERSON (1898), rarely present (never seen by us). Body scales smooth or more or less keeled ante-

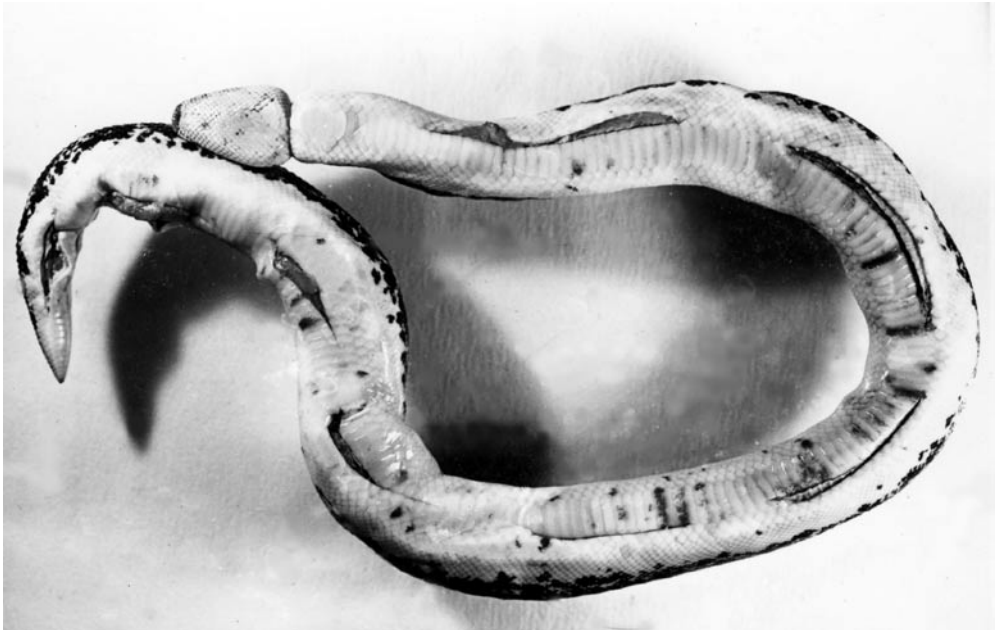


Fig. 5. — *Eryx colubrinus* ♀ MZUF 2108 from Alessandra Island; ventral view (photo by Benedetto Lanza).

riorly, becoming increasingly keeled distad, strongly carinate on the posterior third to fifth of the trunk; supracaudal scales strongly keeled; from 43 (39 according to MOCQUARD 1888, and CHIPPAUX 2001) to 61 midbody scales; ventrals (wider than long system) from 162-(159 according to MOCQUARD 1888) to 205; anal entire, very rarely divided; subcaudals 19-30, normally single, sometimes some of them paired (each pair counted as one subcaudal); tail short (usually 7-9% of total length), conical, more or less pointed. Total length approaching 1 m in the females (BARKER & BARKER 2002) [800 mm (745 + 55 mm) in a female from Hargesa, southern Somalia (HOEVERS & JOHNSON 1982; HoEVERS' unpublished notes)]. The males, more slender and considerably smaller than females, have a relatively longer tail (about 8-11% of total length; ♀♀ 7-10) and longer spurs which become progressively larger with age; according to WALLS (1998b), in some females the spurs may be completely hidden under scales and hard to find.

The hemipenis, studied by BRANCH (1986: 292-293) in two specimens from Ethiopia and Kenya, has been described as follows: «*Eryx colubrinus colubrinus* (Linnaeus). *Voucher specimen*: BMNH 1902.12.12.70, Billen, Ethiopia. *Description*: Retracted, simple, left hemipenis extends to 12th subcaudal, sulcus dividing at 5th. Sulcal forks diverge to lateral aspects of organ, which is undivided, although retractor muscle divided for 1-2 subcaudals, each branch inserting upon organ in region of ipsilateral sulcal termination. *Ornamentation*: Flounced; deep, smooth-walled

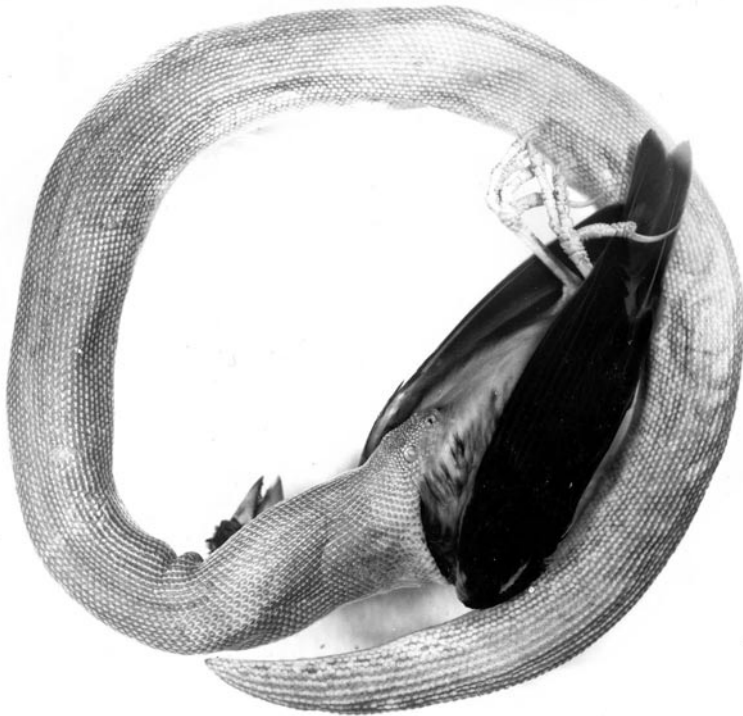


Fig. 6. — *Eryx colubrinus* ♂ MZUF 1735 from Dinsòr, killed by its prey, a *Quelea quelea* (see text), preserved specimen (photo by Benedetto Lanza).

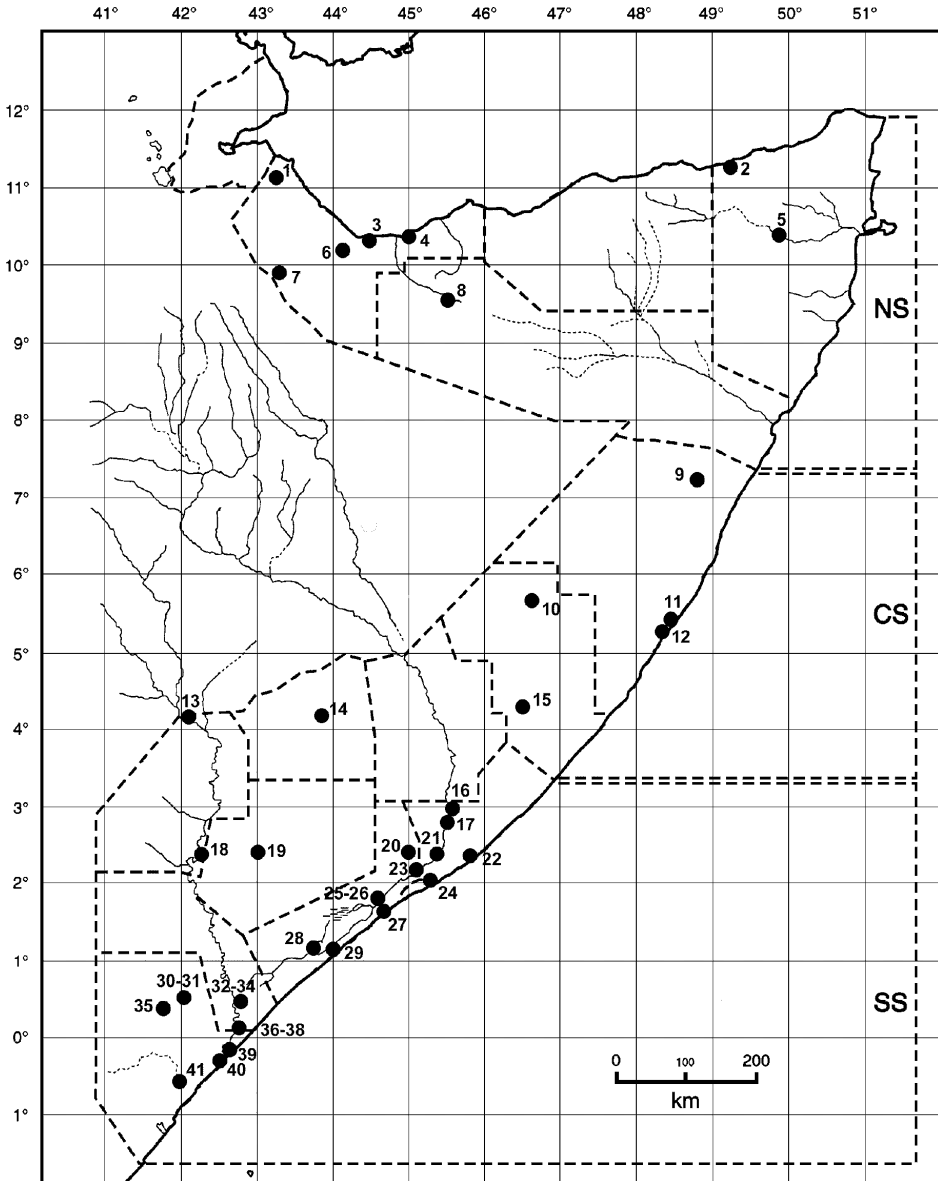


Fig. 7. — Somali distribution of *Eryx colubrinus*. 1, Dadab; 2, Bender Cassim; 3, Bulbar; 4, Berbera; 5, Meledèn; 6, Biji; 7: Borama district; 8, Burao; 9, Geribàn; 10, Dusa Marèb; 11, Obbia; 12, Magangib; 13, Dolo; 14, Oddür; 15, Bud Bud; 16, Mahaddei Uen; 17, Giohàr; 18, Bardera; 19, Dinsòr; 20, Warmahàn; 21, Balàd; 22, Warshèk; 23, Afgoi; 24, Mogadishu; 25, Genale; 26, Uagadi; 27, Sciambòd; 28, Avai; 29, Brava; 30, Afmadù; 31, Xayo; 32, Labadaad (= Alessandra Island); 33, Jilib; 34, Hargesa; 35, Xayo; 36, Bulo Yaag; 37, Belet Amin; 38, Jamame; 39, Jumbo; 40, Kismayu; 41, Lak Badanà.

calyces cover organ distally, becoming shallower and narrower proximally, forming shallow, scalloped flounces encircling organ at level of sulcal furcation; basal section short, nude. Along sulcal fold calyces fused forming two large longitudinal folds, that in turn form outer folds of sulcal forks, possibly facet-like in everted organ. *Eryx colubrinus loveridgei* ('*rufescens*' phase) Stull. *Voucher specimen*: BMNH 1952.1.8.89, Muri Hills (2700 m), Northern Kenya. *Description*: Retracted left hemipenis undivided, extending to 11th subcaudal; sulcus dividing at 3rd subcaudal, forks diverging to lateral aspects of organ. *Ornamentation*: Flounced; similar to typical *colubrinus*, with numerous fine smooth-walled calyces, coalescing proximally to form 5-6 transverse flounces at, and slightly distad to, sulcal furcation».

About 12-15 maxillary and mandibular teeth, solid, ungrooved, arranged in an anodont and scaphiodont set; 5 palatine teeth, of which 3 functional (RIEPPPEL 1978: 186 and TOKAR' 1989: 52, drawing 22 of fig. 5; p. 53, footnote; personal observations); 6-8 pterygoid teeth (RIEPPPEL 1978: 187, TOKAR' 1989: 51), of which only 3 are sometimes functional (personal observations).

ALEXANDER & GANS (1966) (n = 2) found ca 182-184 (ventral) and 270-277 (dorsal) body scale rows, ca 26-28 (ventral) and ca 26-28 (dorsal) tail scale rows, 187-190 body vertebrae and 28-29 tail vertebrae (see also the description of *Eryx*).

For the Somali specimens and two Eritrean females studied by us see Table 1 and Appendix 1.

It is noteworthy that sexual dimorphism significantly affects not only the relative tail length (TaL%), the relative spur length (SL), the ventral (V and VD) and subcaudal (SC) counts, as well as the number of midbody scales (MSR), but also some characters that seem to be devoid of any functional significance: number of interorbitals (IO), circumorbitals (CO), scales between eye and supralabials (OS), and gulars (GL). TOKAR' (1996) studied the following pholidosis characters: TaL%, V, SC, CO, UL, IO (but excluding the upper circumorbitals), number of postinternasals (in the row of scales immediately behind the internasals and between their external posterior corners), number of loreals (in the row bordering the upper labials) between nasal and oculars, number of scales in one midhead longitudinal row from the level of postoculars to postinternasals, and ordinal number (counted from rostral) of the highest upper labial. Dealing with individuals from the almost entire range of the species, he found sexual dimorphism only in TaL%, MSR, V and SC.

The greatest total lengths so far known for Somali specimens are 610 mm [♂ MSNM 636 (ex-collective number 2111)] and 800 mm [♀ held in CAS (HOEVERS & JOHNSON 1982); see above].

For the negative allometric growth of the eye see Table 2.

Some specimens obtained by VAN DER POLS (1986) and VAN WOERKOM (1987) weighed 8.1-8.9 g at birth, 65-140 g at the age 0.5 months, and 8.5 g at birth, 25-35 g at the age of 2.5 months, respectively. According to PITMAN (1938), an Egyptian specimen with a total length of 770 mm weighed 0.6 kg.

Colouration. Fundamentally the species is represented by two phenotypes: *colubrinus*, the most widespread, and *sennaariensis* (of which *rufescens* is a junior synonym), usually occurring sporadically in the same localities as *colubrinus*, but possibly dominating elsewhere. In the phenotype *sennaariensis* the dorsal colouration, uniform or nearly uniform, is light brown (as in the type of *E. rufescens*, a preserved specimen; AHL 1933), purplish-brown [ANDERSON 1898, specimens from Suakin (Sudan; sex not indicated); young ♀ MZUF 5293, from Bud Bud, Somalia] or dark brown; lower scale rows and ventrals whitish or yellowish colour to

Table 1.

Eryx colubrinus: characters of the Somali specimens studied.

Character	Sex	n	Range	Mean	cl (99%)	t	df	P
TaL%	♂♂	31	8.21-11.14	9.64±0.124	9.29-9.98	9.00	57	<0.01
TaL%	♀♀	28	6.78-9.84	7.91±0.149	7.49-8.32			
SL	♂♂	18	20.63-50.00	32.52±2.022	26.66-38.38	6.35	30	<0.01
SL	♀♀	14	25.86-158.06	87.19±9.444	58.74-115.64			
GL	♂♂	34	14-20	15.97±0.255	15.31-16.63	3.22	65	<0.01
GL	♀♀	33	13-23	17.39±0.364	16.46-18.33			
MSR	♂♂	34	47-57	50.77±0.455	49.59-51.94	6.14	63	<0.01
MSR	♀♀	31	46-61	55.36±0.604	53.69-57.02			
V	♂♂	33	168-190	174.97±0.808	172.89-177.05	5.94	62	<0.01
V	♀♀	31	170-197	182.58±1.004	179.82-185.34			
VD	♂♂	32	166-188	172.72±0.815	170.62-174.82	6.02	61	<0.01
VD	♀♀	31	167-194	180.36±0.976	177.67-183.04			
SC	♂♂	33	22-28	25.73±0.290	24.98-26.47	4.53	63	<0.01
SC	♀♀	32	20-30	23.47±0.412	22.41-24.53			

Character	Sex	n	Range	Mean	cl (99%)	G	df	P
IO	♂♂	33	9-12	10.36±0.143	9.99-10.73	19.46	4	<0.01
IO	♀♀	34	9-13	11.29±0.143	10.92-11.66			
CO left	♂♂	33	11-14	12.79±0.161	12.35-13.23	18.02	5	<0.01
CO left	♀♀	34	12-16	13.71±0.182	13.21-14.20			
CO right	♂♂	34	11-15	12.85±0.175	12.37-13.33	21.50	5	<0.01
CO right	♀♀	34	12-16	13.91±0.208	13.34-14.48			
OS left	♂♂	32	2-3	2.28±0.081	2.06-2.50	7.15	1	<0.01
OS left	♀♀	31	2-3	2.61±0.089	2.37-2.86			
OS right	♂♂	33	1-3	2.24±0.087	2.00-2.48	6.04	2	<0.05
OS right	♀♀	31	2-3	2.55±0.091	2.30-2.80			
NO left	♂♂	34	4-6	5.06±0.084	4.83-5.29	6.91	3	NS
NO left	♀♀	34	4-7	5.41±0.113	5.10-5.72			
NO right	♂♂	34	4-6	5.24±0.085	5.01-5.47	2.18	3	NS
NO right	♀♀	34	4-7	5.38±0.104	5.10-5.67			
UL left	♂♂	32	11-14	13.19±0.145	12.79-13.59	15.29	4	<0.01
UL left	♀♀	29	12-15	13.76±0.177	13.27-14.25			
UL right	♂♂	33	11-15	13.27±0.152	12.85-13.69	3.84	4	NS
UL right	♀♀	30	12-15	13.63±0.140	13.24-14.02			

Character	Sex	n	Range	Mean	cl (99%)
RR	♂♂+♀♀	24	2.09-2.92	2.45±0.044	2.32-2.57
NS	♂♂+♀♀	11	43-53	47.55±0.790	45.04-50.05
PC	♂♂+♀♀	12	25-32	28.50±0.571	26.73-30.27
PV	♂♂+♀♀	70	0-7	2.33±0.170	1.89-2.77
H	♂♂+♀♀	27	9-14	10.82±0.245	10.13-11.50

yellow; a ♂ from Dinsor (MZUF 1735) that the senior author saw alive was light reddish-ochrous dorsally and whitish ventrally; iris was reddish-brown. The phenotype *colubrinus* has: dorsal parts with a grey, light yellow, yellow (sometimes with apricot nuances), orange or red-orange ground colour (seemingly depending on the local soil colour), which is more or less largely obscured or almost completely overwhelmed by irregular, roundish or more or less transverse, grey, purplish-brown to blackish-brown or black blotches, frequently confluent on the mesial line of back, and prolonged onto the sides, where there are often small spots of the same colour; in the animals with a prevalently dark back, the light ground colour persists on body and tail as small, irregular spots and about 30 continuous or subcontinuous, mostly transverse stripes, occupying only one side of the body or completely crossing it; the latter are ca 2-4 scales long and 15-20 scales wide; underparts off-white to light yellow, immaculate or, at least in some specimens from S Somalia, with a few, sparsely arranged grey to light brown spots, in addition to which there may be some similarly-coloured transverse bars, each one entirely or nearly entirely affecting a gastrostege; usually a dark, generally ill-defined, oblique streak runs through the eye from the loreal to the temporal region. TOKAR' (1996) distinguished three colour patterns: 0 "standard" (large rounded or oval dark-brown blotches scattered on yellowish background colour), 1 "intermediate" (large rounded or oval dark-brown blotches joined to leave a pattern of scattered yellowish stripes on dark background), and 2 "*rufescens*" [actually "*sennaariensis*"] (back and body sides uniform dark- or red-brown, only lower scale rows on sides and ventrals are yellow); he found that "standard" and "intermediate" patterns are distributed between the sexes in approximately equal proportions, while the "*rufescens*" pattern is more characteristic of males, and that the "*rufescens*" pattern occurs throughout the range of the species in males, while it is completely absent in females from the northernmost and southernmost parts of the range. The southernmost "*rufescens*" Somali specimen seen by us is the ♂ MZUF 1735 from Dinsor (02°28'N 43°00'E). Amelanistic [i.e. albino: DOUGLAS 1993] and anerythristic variants have recently become available to herpetoculturists (TRACER 1996). More specific information on these mutants has been given by BARKER & BARKER (2002: 2): «In early 1995 a female albino East African sandboa was imported into the United States from Tanzania. So far as we know, this is the first record of albinism in this taxon.» and «[...] unexpected axanthic [i.e. anerythristic: DOUGLAS 1993] babies were born to normal adults. Axanthic snakes are missing yellow, red, and brown pigments. Axanthic baby Kenyan sand boas are black with bluish-white pale markings, they grow to become black and white adults with black button eyes. This mutation has been demonstrated to be an inheritable trait, apparently a simple recessive mutation». Fine colour illustrations

Abbreviations: cl = confidence limits; df = degrees of freedom; CO = number of circumorbital scales; GL = number of gulars between mental and first pseudoventral; H = subcaudal reached by the retracted hemipenis; IO = lowest number of interorbital scales (including the upper circumorbitals); MSR = numbers of longitudinal rows of scales at midbody; NO = lowest number of scales between postnasal and eye; NS = number of longitudinal rows of scales behind the occiput; OS = lowest number of scales between eye and upper labials; PC = number of longitudinal rows of scales a head length anterior to the cloaca; PV = number of pseudoventrals; RR = rostral width/rostral depth; SC = number of subcaudals; SL = tail length/spur length; TaL% = tail length × 100/total length; UL = upper labials, supralabials; V = number of ventrals according to the "wider than long system", i.e. of pseudoventrals + true ventrals; VD = number of ventrals according to the "Dowling system", i.e. of the true ventrals.

Table 2.

Negative allometric growth of the eye in *Eryx colubrinus*.

Sex	SnL	EHD	SnL/EHD
♀	4.40	1.80	2.44
♂	4.50	1.70	2.65
♀	4.50	1.85	2.43
♂	4.60	2.35	1.96
♀	4.80	1.90	2.53
♂	4.90	2.00	2.45
?	4.90	1.60	3.06
♀	5.00	2.00	2.50
♂	5.50	1.80	3.06
?	5.95	2.10	2.83
♀	6.80	2.40	2.83
♂	7.00	2.60	2.69
♂	7.40	2.30	3.18
♂	7.50	2.50	3.00
♂	7.60	2.34	3.25
♀	8.00	2.50	3.20
♀	8.30	2.50	3.32
♂	8.40	2.90	2.90
♀	8.40	2.40	3.50
♀	8.60	2.80	3.07
♀	9.10	2.30	3.96
♂	9.20	2.95	3.12
♀	9.70	2.80	3.46
♀	9.70	2.40	4.04
♀	11.50	2.50	4.60
♀	12.20	2.95	4.14

Measures in mm; SnL= snout length, i.e. distance between snout tip and eye; EHD = horizontal eye diameter.

of the species may be found in ANDERSON (1898), PITMAN (1938), KUNDERT (1974), DATHE (1985), STAFFORD (1986), POLS (1986), COBORN (1991), SHINE (1992, 1998), MATTISON (1995), TRACER (1996), WALLS (1998b; also colour mutants), CHIPPAUX (2001), and SPAWLS et al. (2002).

Distribution (Fig. 7). Northern Africa from Niger (Air) east to Egypt, including Sudan, Ethiopia, Eritrea, Somalia, and, according to BROADLEY & HOWELL (1991), arid areas of Kenya and northeastern Tanzania (Msembe, near Ruaha National Park, and Kahe); about the erroneous records from Morocco and Yemen see ANDERSON (1898: 235, footnote 1) and LANZA (1966: 37, footnote 10; 1983: 233, footnote 1), respectively.

Biogeography. PARKER (1949) hypothesized that *E. colubrinus* might be a recent entrant into Somalia, which penetrated the region from the north and from

the south; TOKAR' (1996) disagreed with Parker and, on the basis of an elaborate statistical research, stated: «I think that Ethiopia was the origin and expansion centre of *G. colubrinus* in Africa. As the land rose, this species spread to the coastal plains of Somalia and later penetrated Kenya, the Sudan and Egypt».

Geographical variability (see also Description). STULL (1932) separated eastern African specimens of this species under the name *Eryx thebaicus loveridgei*, distinguishing them from those of northern Africa in having a higher number of midbody scales (53-59 instead of 47-49), a lower average number of ventrals (168-182, average 173.2), instead of 175-192 (average 184.8), and immaculate belly and sides. In 1933 AHL, overlooking *Eryx jaculus* var. *sennaariensis* Jan 1863 (see above), described the new species *Eryx rufescens*.

Three years later LOVERIDGE (1936: 235) confirmed the occurrence in *loveridgei* of only a lower average number of ventrals, reduced *rufescens* to the subspecies level and arranged the following tentative key: «dorsal coloring uniform, ventrals 181-194, average (2 ex.) 187 = *E. c. rufescens*; dorsal coloring consisting of heavy blotches ventrals 175-197, average (36 ex.) 186.3 = *E. c. colubrinus*; ventrals 162-182, average (24 ex.) 170.8 = *E. c. loveridgei*».

Later SCORTECCI (1939a) questioned the validity of *rufescens* and supported *loveridgei*, giving the following figures: 47-49 midbody scales and 175-197 ventrals in *colubrinus*, 50-50 and 162-185 in *loveridgei*, 44-50 and 181-194 in *rufescens*.

PARKER (1949), dealing with Somali snakes, wrote that «The material available to the present author is insufficient to throw fresh light on the status of *loveridgei* and the single available specimen from Guban (*rufescens*) can be matched exactly amongst specimens from Egypt. It is possible that *Eryx colubrinus* is a recent entrant into Somaliland from both the north and the south and that further collecting may show that a uniform reddish colouring which appears sporadically in Egypt, is present in a sufficient majority of the population along the northern invasion route to justify the recognition of a local race under the name *rufescens*» [actually *sennaariensis*; see above].

TOKAR' (1996), studying morphometric indices, pholidosis and colour pattern of 178 specimens (98 ♂♂, 80 ♀♀) from almost the entire range of the species and using elaborate statistical methods, confirmed the monotypy of the species, already supported by WELCH (1982), LANZA (1983, 1990), KLUGE (1993a) and LARGEN & RASMUSSEN (1993), and pointed out «the lack of hiatus in any part of the species range and that variance has a strong radial trend with a slight tendency towards a south-east-northwest cline».

Biology (see also under *Eryx*, Biology). The species, usually associated with arid and semi-arid habitats, has been recorded at altitudes between sea level and about 1300 m (in Ethiopia; LARGEN & RASMUSSEN 1993) and 1500 m (SPAWLS et al. 2002). In Somalia it has been found in many different ecosystems which, according to the geobotanical map published by PICHI-SERMOLLI (1957), are characterized by the following types of vegetation: grass, perennial herb and subshrub steppe; shrub steppe, subdesert scrub; broken xerophilous open woodland; xerophilous open woodland; savanna; lowland dry evergreen forest; coastal formations; riparian formations.

Its habits in nature are poorly known, but are probably very similar to those of its congeners (see also *Eryx*, Biology). *Eryx colubrinus* is a burrowing, semi-nocturnal species usually living by day in different types of vacuities (crevices, holes, termite-hills, etc.) or buried in sand, from which it emerges at night for

hunting or occasionally by day, especially in the early morning, for hunting or basking; underground it probably hunts both at night and by day. «In areas where the soil is mostly hard (such as the low eastern foothills of Mt Kenya) it will live in sandy riverbeds, which must put it at risk in flash floods» (SPAWLS et al. 2002: 311-312). It may shelter, partially buried, under rocks, bark, logs, or dumped objects, sometimes close or inside huts (as, f.i., MZUF 28538). According to SPAWLS et al. (2002: 311), the strongly keeled scales on the tail and the final fifth of the body «may aid locomotion or have a defensive purpose» (see also *Eryx*, Biology).

We know the following dietary records for *E. colubrinus* (see also PITMAN 1958: 104, whose citation of CANSDALE (1955: 23) is incorrect since the latter refers to *E. muelleri*, not to *E. colubrinus*): mice and small birds (LOVERIDGE 1923); small birds, lizards and young rodents (CORKILL 1935); small rodents and birds up to the size of a quail (PITMAN 1938: 63); *Charadrius asiaticus* Pallas 1773 (Charadriidae) [LOVERIDGE 1956: 142, writes: «The late Blayney Percival once told me he had surprised a (sand) boa at Voi trying to swallow a Caspian Plover (*Charadrius asiaticus*), but the migrant proved too big a mouthful and after a couple of futile attempts the snake gave it up»]; *Motacilla aguimp* Dumont 1821 (Motacillidae) and other unidentified birds (PITMAN 1958); mice and Scincidae of the genus *Mabuya* Fitzinger 1826 [= *Trachylepis* Tschudi 1845] (HOEVERS & JOHNSON 1982; captive specimen from southern Somalia); *Stenodactylus* Fitzinger 1826 sp. (Gekkonidae; GASPERETTI 1988); the burrowing Bathyergidae naked mole-rat *Heterocephalus glaber* Rüppell 1842 (BRAUDE 1991); SPAWLS et al. (2002: 312) state that «The juveniles eat mostly lizards (especially *Heliobolus* Fitzinger 1843 and *Latastia* Bedriaga 1884), large adults take rodents as well, and even birds, indicating how well they are concealed and how rapidly they strike»; Fig. 6 shows a ♂ 358 mm long, from Dinsør (MZUF 1735), found dying by a native, with the body walls pierced at the esophageal level by the strong bill of a red-billed weaver [*Quelea quelea* (Linnaeus 1758); total length ca 104 mm, tail length ca 32 mm], of which the snake had swallowed the head (LANZA & BARBAGLI in preparation). The juveniles obtained by SCHWEIZER (1972), LAMERS (1984), POLS (1986), SHARP (1992), and TRACER (1996) accepted, only a few days after birth, newborn naked mice for food. SHARP (1992), who obtained 10 babies in captivity, stated that only two of them constricted their food.

According to LOVERIDGE (in litt., quoted by PITMAN 1938: 64) «Though capable of inflicting a painful bite, this sluggish reptile relies for its protection on the appalling odour which it discharges from its cloaca when molested» (cf. also SPAWLS et al. 2002).

According to TRACER (1996) *E. colubrinus* is a highly seasonal breeder, seemingly not requiring the pre-breeding cooling period so vital to other boids, and relatively easy to breed in captivity. The number of neonates per delivery ranges between 4 and 20 (SPAWLS et al. 2002). LOVERIDGE (1936: 234) reported that at Voi, Kenya, on April 24, 1934, «a native brought in a female and her seven young [evidently her recently born litter, according to FITCH 1970] which he had found altogether in a hole. The length of the mother is given above [634 (584 + 47) mm], the young ranged from 176 to 189 mm»; SCHWEIZER (1972) obtained some deliveries, each of 10-15 offspring, in captivity; the newborns were 20 cm long. LAMERS (1984) bred a female about 18 months old with a male about 4 years old (living together from 7.VI.1983) in a terrarium measuring 100 × 50 × 50 cm, with a layer of sand about 15 cm deep, and at a temperature of 23-36 °C. He observed copulations between 8.VI.1983 and 10.VII.1983 and obtained 17 offspring on 25.X.1983, measuring about 19 cm and with an average weight of 8 g; the first sloughing was

after 9 days. POLS (1986: 209-211), dealing with three captive specimens received on 8 March 1983 from Kenya (a ♂ of 40 g, two ♀♀ of 48 and 59 g), stated: «Early in April 1984, I observed the male's first attempts at copulation. Copulation poses an interesting problem for a burrowing species such as the Kenyan sandboa. Since the female is usually always buried underneath a layer of sand, the male must somehow dig her out in order to mate with her. The male accomplishes this by digging his head under the (much larger) female, coming up on the other side, and then lifting the female out of the sand with the fore-part of his body. He then throws the first part of his body over the female, making a loop around her. Once in this position, the male will slide the loop down the female's body, moving the position of the loop down his own body at the same time, until their vents are opposite each other and he is able to work her with his spurs. In spite of all this, the male did not seem to be having any success at these first attempts. The females would only try to bury themselves deeper in the sand. These mating attempts lasted from about noon until the next morning, but I do not think that the male had any success at all during that period because the females just did not seem to want to co-operate. Finally I decided to put the male back into his own cage. Strangely enough, he did not begin to eat until August; and then only irregularly. Early in June 1985, I put the male in with the females again. He began his copulation attempts within a few days. It seemed that the orange female was more co-operative than the yellow female as on 2 July 1985, I observed an actual copulation with the former. I have not observed any copulations involving the yellow female in spite of the interest the male has shown. It is my opinion that this mating behaviour was induced by a lengthened photo-period and a rise in temperature. [...] The orange female started to refuse all food on 17 August 1985. The second half of her body had begun to visibly swell. She also sun-bathed more often. At first she lay only in the vicinity of the bulb from the beginning of the day on, but as the state of her pregnancy progressed, she began to lie more directly under the bulb. Maybe it would have been better if I had heated the sand from underneath; it just seems to me more natural for a sandboa to soak up heat while buried in the sand than when lying on the surface. [...] On 4 December 1985, the orange female gave birth to fourteen young snakes, two of which were still-born. When I discovered them, at about six o'clock in the evening, most of the juveniles and their mother (who was behaving restlessly) still lay on the surface of the sand. One hour later they had all burrowed out of the sight. The next day, I separated the young from their mother. Of the twelve, six were yellow and six were orange. One yellow and one orange juvenile had died before birth. Their birth-weights varied from 8.1 to 8.9 g. Within two weeks they had all sloughed and had all started to feed on new-born ("pinky") mice. The weight of the orange female after her pregnancy had dropped from about 500 g to 360 g. Eight of the young snakes were sold shortly after they had started to eat. The remaining four I have kept and these are developing well. On 20 October 1986, they weighed 65, 80, 95 and 140 g». WALLS (1998b), whose mating description agrees with that by POLS (1986), stated that in some cases «the short tails of the couple end up projecting vertically through the surface of the sand». SHARP (1992), breeding a female about 40 cm long with a male about 30 cm long in a terrarium measuring 90 × 30 × 38 cm, with a substrate of silver sand of a depth of 7.5 cm, observed several attempted matings from mid-January 1991 to early February; no actual matings were witnessed, but the female began to increase in size in late February; the birth of her 10 babies, weighing 7 g each, was observed on 27 June 1991 between 07:00 pm and 09:30 pm; all of the young had sloughed within 7 days. According to MEER (1997:

14) *E. colubrinus* copulates in June and July and after ca 4 months the female gives birth to 10-13 young about 20 cm long; «in the wild, females have a litter every two years, but in captivity they may produce offspring every year»; he kept his animals in a terrarium measuring 70 × 60 × 35 cm, with a layer of sand about 6 cm deep, and at a temperature of 22-35 °C. A Ngomeni (Kenya) specimen had 8 young and 7 infertile eggs in mid-November (SPAWLS et al. 2002). The neonates' length ranges between 15 (SPAWLS et al. 2002) and 20 cm. According to TRACER (1996: 48), one of the only references to age at sexual maturity in *E. colubrinus* «was made by ROSS & MARZEC [...] (1990): "Although sexual maturity seems to be reached in about three to four years in females, one second generation mating was reported in which the female was 18 months old". It is unclear whether or not this mating was fertile as its outcome was not reported. They added later, "Males reach sexual maturity at about three years"» (see also WALLS 1998b). Anyway, a pair of *E. colubrinus* bred by the same author (TRACER 1996) reached sexual maturity in 14 months (at which time their first courtship was observed) and the female produced its first clutch at approximately 19 months of age.

Specimens of *E. colubrinus* often live for 8-10 years in captivity (WALLS 1998b).

The growth rate of *E. colubrinus* is illustrated by the following examples from specimens kept in captivity (VAN WOERKOM 1987): (1) a female: newborn = 200 mm; 5 years old = 510 mm; 8½ years old = 630 mm; (2) a male = 390 mm; after 2½ years = 485 mm; (3) six newborn specimens = 200 mm, 8.5 g; after 2½ months = 270-310 mm; 25-35 g.

***Eryx somalicus* Scortecci 1939 (Figs 8-14, 18)**

Eryx somalicus SCORTECCI 1939a: 269 [terra typica: environs of Mogadiscio (= Mogadishu), ca 02°01'N 45°20'E, Somalia; holotype MSNM 581 (formerly 2118)].

Derivatio nominis. The species name derives from the Latin *somaticus* (masculine adjective; feminine: *somalica*; neuter: *somalicum*): "of, relating to, characteristic of Somalia", or "inhabiting Somalia".

Ethnozoology. No data available, but this species is surely as feared as *E. colubrinus* by natives.

Somali records. Haud, 44°44'E 8°45'N, 3500 ft (PARKER 1949: 27, 1 ♀ BMNH 1949.2.1.46, leg. R.H.R. Taylor, VIII.1932, or 1933; LARGEN & RASMUSSEN 1993: 327, map 7 of p. 409, 1 ♀ BMNH 1949.2.1.46, leg. R.H.R. Taylor, VIII.1932, or 1933); Mahaddei Uen (SCORTECCI 1939a: 269, 1 spec. MSNG, leg. L. Saito, 1915); Mogadishu (3 km north) (GANS & LAURENT 1965: 60, 1 spec. MCZ R 72038, Gans' Exp., 26.VIII.1961); Mogadishu (coastal zone) (GANS 1965: 10); Mogadishu (environs of) (SCORTECCI 1939a: 269, 1 ♀ MZUF 33636, former 2119, MSNM paratypus, leg. Confalonieri 1935, and 1 ♀ MZUF 581, former 2118, MSNM holotypus, leg. G. Scortecci, 1931); northern coastal belt of Somalia, Guban, central Somalia, Somalia south of Shebelli River (BALLETT 1968: 267); northern (regions Togdheer and Bari) and southern (regions Mogadishu and Middle Shebelli) Somalia (LANZA 1983: 221; 1990: 431); Somalia (BALLETT 1968: 214; WALLS 1998b: 191, unnumbered fig. of p. 191, map of p. 192).

Material studied. Nine specimens have been examined from the following localities: Bud Bud (1 spec. MZUF 5250 and 1 ♀ MZUF 5251, leg. SBS 1968, 16.VIII.1968); Garbaqabat (1 ♀ MZUF 27653, leg. SBS 1980, 28.IV.1980); Gardò (1 ♀ MZUF 2588, leg. G. Scortecci, autumn 1953; 1 ♀ MZUF 6714, leg. SBS, 19.X.1973); Haud (locality of), 44°44'E 08°45'N, 3500 ft (=

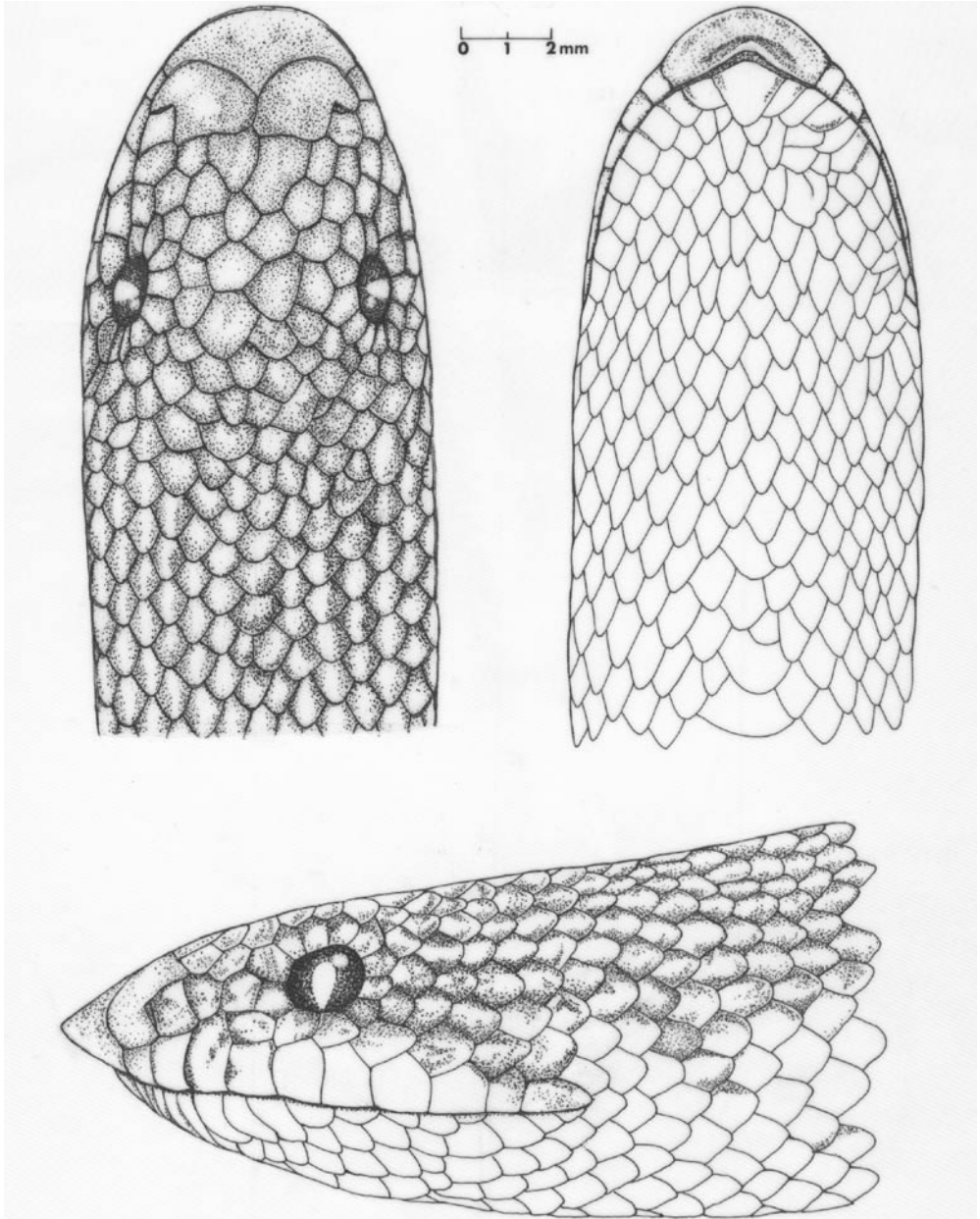


Fig. 8. — Head and neck of *Eryx somalicus* ♀ MSNM 581 (holotypus) from the environs of Mogadishu; dorsal, ventral and lateral view (drawing by Manuela Mascherini).

ca 1150 m a.s.l.) (1 ♀ BMNH 1949.2.1.46, leg. R.H.R. Taylor, VIII.1932, or 1933); Mogadishu (environs of) (1 ♀ MZUF 33636, ex 2119 MSNM, in exchange from the MSNM, paratypus, leg. Confalonieri, 1935; 1 ♀ MSNM 581, ex 2118, holotypus, leg. G. Scortecchi, 1931); Mogadishu (3 km N of) (1 spec. MCZ R 72038, leg. C. Gans' Exp., 26.VIII.1961).

Description (Figs 8-14).

Morphology. Dorsal head scales more or less enlarged, smooth, juxtaposed as far as eye level, imbricate backwards; scales between the anterior level of eyes and postnasal larger than in *E. borrii*, their minimum number along the middle region of the snout $1\frac{3}{4}$ (vs 3 in *E. borrii* n. sp., see below); rostral large and broad, about 2 times wider than high, with a labial angular horizontal edge; nostril surrounded mostly by 2 scales only (internasal-prenasal complex and postnasal), since the internasal is usually fused with prenasal bilaterally [completely fused in 8 of 9 specimens checked: MSNM 581 (formerly 2118; holotypus), MZUF 6714, 27653, 5250, 5251, 2588, 33636, BMNH 1949.2.1.46; fused only on the right side in MCZ R 72038]; 4(5.4)6 interorbital and 9(10)11 circumorbital scales; eye separated from the labials by 1 scale; 2(2.9)3 scales between the postnasal and the eye; 8(9.71)10 supralabials; 11(11.6)12 scales between the mental and the first pseudoventral; mental groove absent; body scales smooth anteriorly, becoming increasingly keeled distad; tail scales strongly keeled; 34(37.2)40 mid-body scales; ventrals (wider than long system) 156(158.7)163, Dowling system 155(156.3)158; anale entire; 21(22.6)25 single subcaudals; tail short, about 8-10.5% the total length, conical, pointed, sometimes more or less curved downward at tip. Size seemingly small; the ratio total length/maximum transverse diameter 24.03-30.00 (n = 4); the largest specimen known thus far, the ♀ MZUF 33636, has a total length of 390 mm. GANS & LAURENT (1965), referring to the unsexed specimen MCZ R 72038 from Mogadishu (probably ♀, VAN WALLACH personal comm.), pointed out that «there is both increase and reduction of dorsal scale rows, as well as the intercalation of additional scales within the dorsal rows. The latter occurs commonly in the second and third lateral rows, and the additional scales are found in all rows dorsal to the row in question. The 159 ventrals thus correspond to 204 scales along the mid-dorsal line».

Hemipenis unknown.

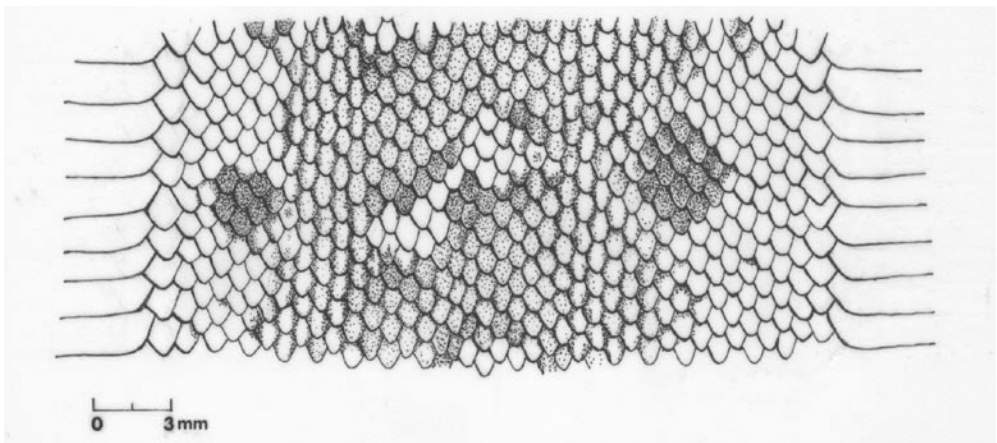


Fig. 9. — Midbody view of *Eryx somalicus* ♀ MSNM 581 (holotypus) from the environs of Mogadishu (drawing by Manuela Mascherini).

Maxillary and mandibular teeth solid, ungrooved, arranged in an anodont and scaphiodont set; RIEPPEL (1978), who studied the skull of the specimen MZUF 5250, found 9 maxillary teeth, 4 functional teeth on the palatine dentigerous process and only 3 teeth on the shortened pterygoid; TOKAR' (1989), who studied the same skull (cf. p. 47), found 5 palatine teeth (p. 53) and 5 pterygoid teeth (3 teeth and 2 sockets; footnote of p. 51); in 3 dead specimens with open mouth we counted ca 8-9 maxillary and mandibular teeth, 4 palatine functional teeth, and 3-4 pterygoid functional teeth.

Table 3.

Eryx somalicus: characters of the Somali specimens studied.

Character	Sex	n	Range	Mean	cl (99%)
TaL%	♂	1	8.28	—	—
TaL%	♀♀	7	8.07-10.42	8.88±0.306	7.75-10.02
RR	♀♀	5	1.93-2.22	2.09±0.049	1.86-2.32
IO	♂♂+♀♀	10	4-6	5.40±0.221	4.68-6.12
CO left	♂♂+♀♀	10	9-11	9.90±0.233	9.14-10.66
CO right	♂♂+♀♀	10	9-11	10.00±0.258	9.16-10.84
OS left	♂♂+♀♀	10	1	1.00±0.000	—
OS right	♂♂+♀♀	10	1	1.00±0.000	—
NO left	♂♂+♀♀	7	2-3	2.86±0.143	2.33-3.39
NO right	♂♂+♀♀	7	2-3	2.86±0.143	2.33-3.39
UL left	♂♂+♀♀	7	8-10	9.71±0.286	8.66-10.77
UL right	♂♂+♀♀	8	9-10	9.88±0.125	9.44-10.31
GL	♂♂+♀♀	5	11-12	11.60±0.245	10.47-12.73
NS	♂♂+♀♀	7	33-38	35.14±0.634	32.79-37.49
MSR	♂♂+♀♀	10	34-40	37.20±0.593	35.27-39.13
PC	♂♂+♀♀	8	23-27	25.88±0.515	24.07-27.68
V	♂♂+♀♀	9	156-163	158.67±0.764	156.10-161.23
VD	♀♀	4	155-158	156.25±0.750	151.87-160.63
PV	♀♀	4	2-3	2.5±0.289	0.81-4.19
SC	♂♂+♀♀	10	21-25	22.60±0.499	20.98-24.22

Abbreviations as in Table 1.

Table 4.

Negative allometric growth of the eye in *Eryx somalicus*.

Sex	SnL	EHD	SnL/EHD
♀	3.30	1.40	2.36
♀	3.55	1.56	2.28
♀	5.00	2.00	2.50
♀	5.10	2.00	2.55
♀	5.60	1.80	3.11

Measures in mm; SnL= snout length, i.e. distance between snout tip and eye; EHD = horizontal eye diameter.

For the characters of the examined specimens (7 ♀♀, 1 ♂?, 2 unsexed specimens), corresponding to almost all the known ones, see Table 3 and Appendix 1. The negative allometric growth of the eye is shown in Table 4.

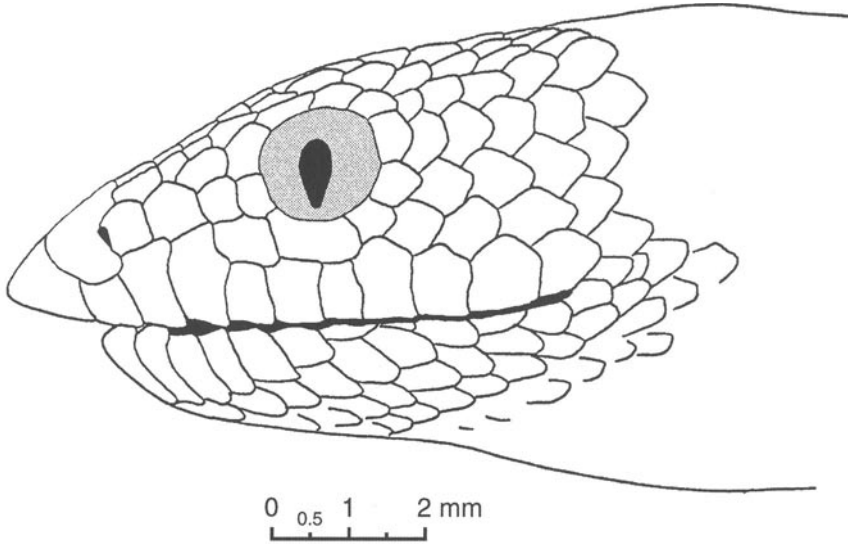


Fig. 10. — Side view of the head of *Eryx somalicus* ♂? MZUF 5250 from Bud Bud (drawing by Benedetto Lanza).

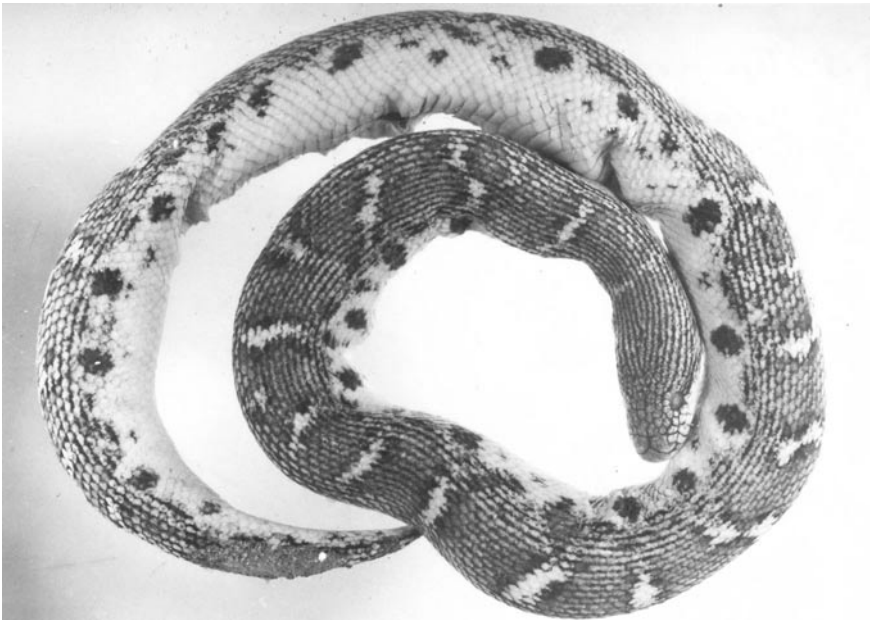


Fig. 11. — *Eryx somalicus* ♀ MSNM 581 (holotypus) from the environs of Mogadishu, preserved specimen (photo by Benedetto Lanza).

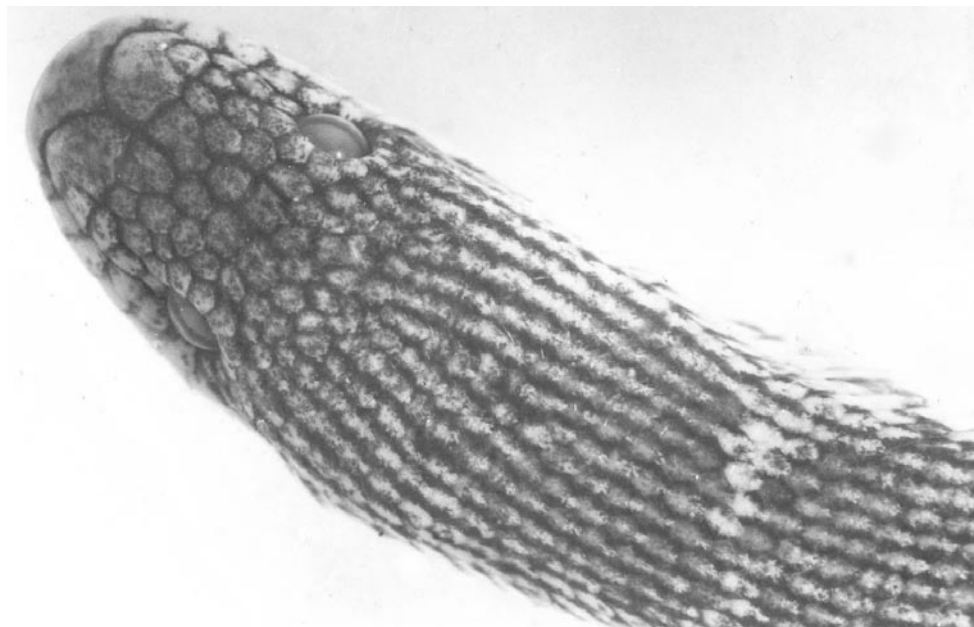


Fig. 12. — *Eryx somalicus* ♀ MSNM 581 (holotypus) from the environs of Mogadishu, preserved specimen; head and neck, dorsal view (photo by Benedetto Lanza).



Fig. 13. — *Eryx somalicus* ♀ BMNH 1949.2.1.46 from Haud, preserved specimen (photo by Benedetto Lanza).

Colouration (in alcohol). Pattern rather variable. Dorsal ground colour light to rather dark brown, crossed by about 30 off-white, sometimes dark-edged, transverse to more or less oblique stripes, each approximately 1-6 scales long; some of the light stripes may fuse with each other forming Y or X shaped marks. Furthermore the back is finely dark-striped longitudinally, since each dark scale is off-white medially. Lower parts of the flanks off-white with dark, irregular small spots and sometimes with a series of brownish black, larger roundish spots, each usually underlying a light dorsal stripe.

Distribution. Thus far *Eryx somalicus* is known only from Somalia but, since it has also been collected along the border between Somalia and Ethiopia, it «will undoubtedly be found eventually in neighbouring parts of eastern Ethiopia» (LARGEN & RASMUSSEN 1993: 327). WALLS' (1998b) statement about its occurrence in Ethiopia is merely conjecture.

Biology. Practically unknown, but probably very similar to that of its congeners (see *Eryx*, Biology). The species, usually associated with sandy, arid and semi-arid habitats, has been recorded at altitudes between sea level (Mogadishu) and about 1150 m (Haud, 3500 ft). It has been found in rather different ecosystems which, according to the geobotanical map published by PICHI-SERMOLLI (1957), are characterized by the following types of vegetation: shrub steppe, subdesert scrub, broken xerophilous open woodland, xerophilous open woodland, and coastal formations. PARKER (1949) stated that the «specimen from the Haud was collected in August in sandy country with patches of grass and scattered large thorn trees; it was found during daylight half in and half out of a hole in the ground». The Moga-



Fig. 14. — *Eryx somalicus* ♀ MZUF 5251 from Bud Bud, preserved specimen (photo by Saulo Bambi).

dishu specimen mentioned by GANS & LAURENT (1965) «was taken on the beach at an altitude of 5 m, some 10 m from the breaker zone. It was coiled in a small space in sand between two rocks. On first sight its color pattern was reminiscent of the *Dasypletis* found in the same zone, but the individual did not engage in defensive behavior». The MZUF 5250 from central Somalia (Bud Bud) was collected under a stone in the broken xerophilous open woodlands.

The stomach of a juvenile (♂? MZUF 5250) 145 mm long contained an *Hemidactylus* with a snout-vent length of about 45 mm.

The ♀ MZUF 6714 from Gardò, total length 254 mm, has an ovary with 5 eggs of comparable size, the largest one 6 mm long; the largest egg still present in the ♀ MZUF 2588 from Gardò, total length about 240 mm and strongly damaged abdomen, is 5.2 mm long.

Eryx borrii n. sp. (Figs 15-18)

Material studied. 1 ♀ holotype, BMNH 1900.11.28.4, Biji (400 m a.s.l.), leg. Donaldson Smith.

Description of holotype (Figs 15-17).

Morphology. Dorsal head scales enlarged, smooth, juxtaposed as far as eye level, imbricate backwards; scales between the anterior level of eyes and postnasal smaller than in *E. somalicus*, their minimum number along the middle region of the snout 3; rostral large and broad, about 2.5 times wider than high, with a labial angular horizontal edge; nostril surrounded by 2 scales only (postnasal and a scale deriving from the fusion of internasal and prenasal, seemingly only partially fused on the right side); 5 interorbital and 10/10 circumorbital scales; eye separated from the labials by 1/1 scale; 3/3 scales between the postnasal and the eye; 10/11 supralabials; 12 scales between the mental and the first pseudoventral; mental groove absent; body scales smooth anteriorly, becoming increasingly keeled distad; tail scales strongly keeled; 39 mid-body scales; ventrals (wider than long system) 193, Dowling system 189; anal entire; 26 single subcaudals; tail short, about 8.25% the total length, conical, pointed, slightly curved downward at tip. Body slender, the ratio total length/maximum transverse diameter about 39.35; total length of 390 mm.

Maxillary and mandibular teeth solid, ungrooved, arranged in an anodont and scaphiodont set; about 8-9 maxillary and mandibular teeth; palatine and pterygoid not counted.

Colouration (in alcohol). Dorsal ground colour brown, lighter on head and sides of body, with longitudinal or more or less oblique off-white fragmented stripes, sometimes fused to form undulating narrow bands. Lower parts of the flanks off-white with dark, irregular small spots and sometimes with a series of brownish black, larger roundish spots.

Derivatio nominis. We take pleasure in dedicating this new species to our friend Dr Marco Borri (Sezione Zoologica «La Specola», Museo di Storia Naturale dell'Università degli Studi di Firenze), irreplaceable companion and valuable collaborator during several expeditions in Italy and abroad.

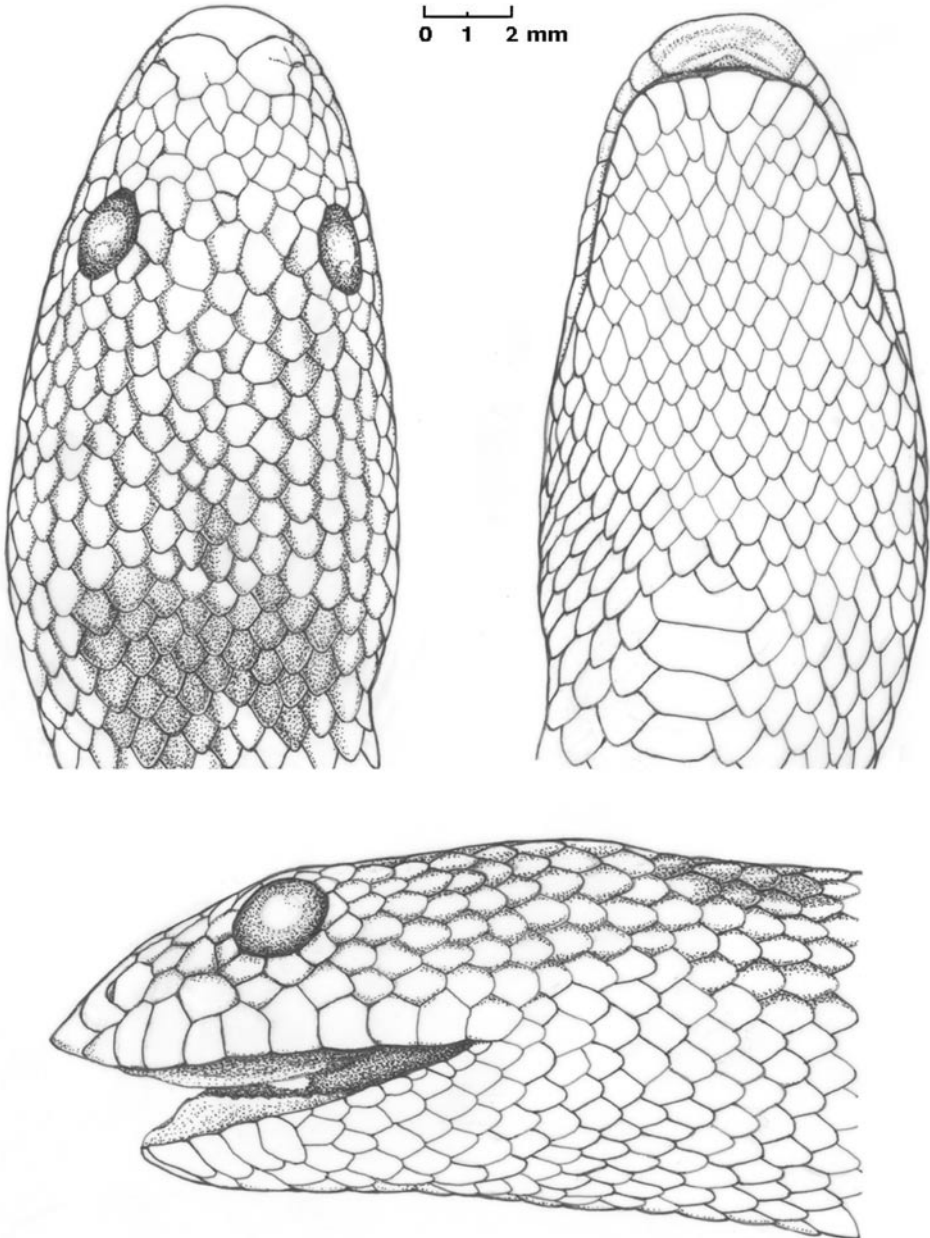


Fig. 15. — Head and neck of *Eryx borrii* ♀ BMNH 1900.11.28.4 (holotypus) from Biji; dorsal, ventral and lateral view (drawing by Manuela Mascherini).

Ethnozoology. No data available, but this species is surely as feared as *E. colubrinus* by natives.

Somali records. Biji (PARKER 1949: 27, 1 ♀ BMNH 1900.11.28.4, leg. A. Donaldson Smith; LARGEN & RASMUSSEN 1993: 327, map 7 of p. 409, ♀ BMNH 1900.11.28.4); Northern Somalia (region West Galbeed) (LANZA 1983: 221; LANZA 1990: 431).

Remark on the Somali records. GANS & LAURENT (1965: 61) stated: «It should be noted that the upland (3,500 ft) record, whose counts are cited by Parker, has 193 rather than 159 ventrals. This suggests the presence of a distinct high altitude (or northern?) population». GANS & LAURENT (1965) obviously refer to the ♀ BMNH 1900.11.28.4 from Biji, but their altitudinal indication is wrong; Biji is only 400

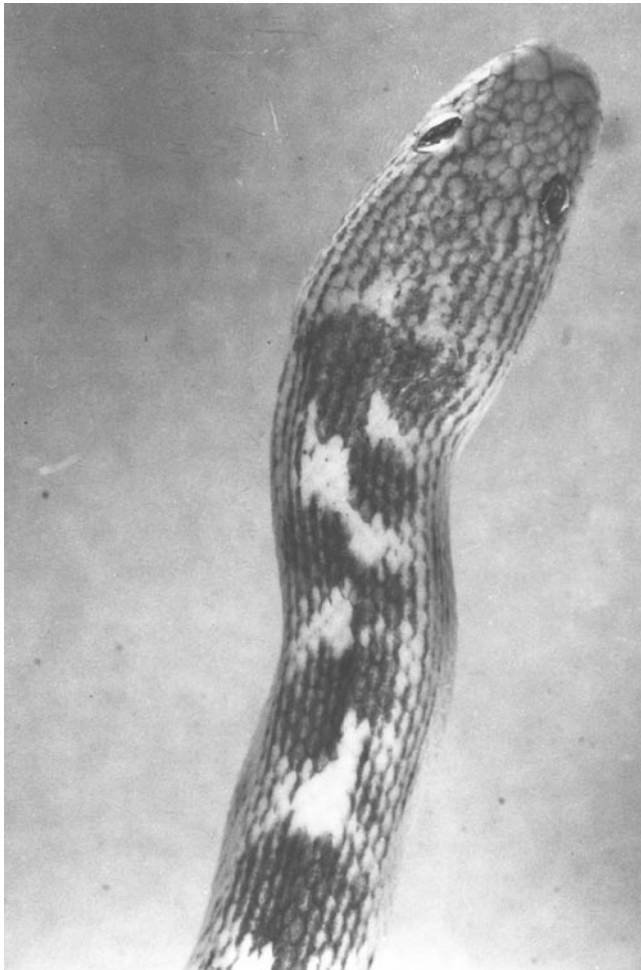


Fig. 16. — *Eryx borrii* ♀ BMNH 1900.11.28.4 from Biji, preserved holotypus; head and anterior part of the body, dorsal view (photo by Benedetto Lanza).

m a.s.l. and the altitude of 3,500 ft (ca 1150 m) cited by PARKER (1949) actually relates to the locality of the Haud (44°44'E 08°45'N) where the ♀ of *Eryx somalicus* 1949.2.1.46 BMNH was collected.

Distribution. Thus far *Eryx borrii* is known to occur only in the type locality.

Biology. Unknown, but probably very similar to that of its congeners (see *Eryx*, Biology). Judging from the geobotanical map published by PICHI-SERMOLLI (1957), the only known specimen of the species was probably collected in the shrub steppe.

Remarks. The new species is morphologically close to *E. somalicus* from which it is distinguished by a more slender *habitus* (ratio total length/maximum transverse diameter about 39.35, versus 24.03-30.00 in *E. somalicus*); a larger number of ventral scales (193 instead of no more than 163 in *E. somalicus*); smaller size of the scales between the anterior level of eyes and postnasal (their minimum number along the middle region of the snout 3, versus 1¾ in *E. somalicus*). The dorsal pattern shows longitudinal or more or less oblique off-white fragmented stripes that are transverse to more or less oblique in *E. somalicus*.



Fig. 17. — *Eryx borrii* ♀ BMNH 1900.11.28.4 from Biji, preserved holotypus (photo by Benedetto Lanza).

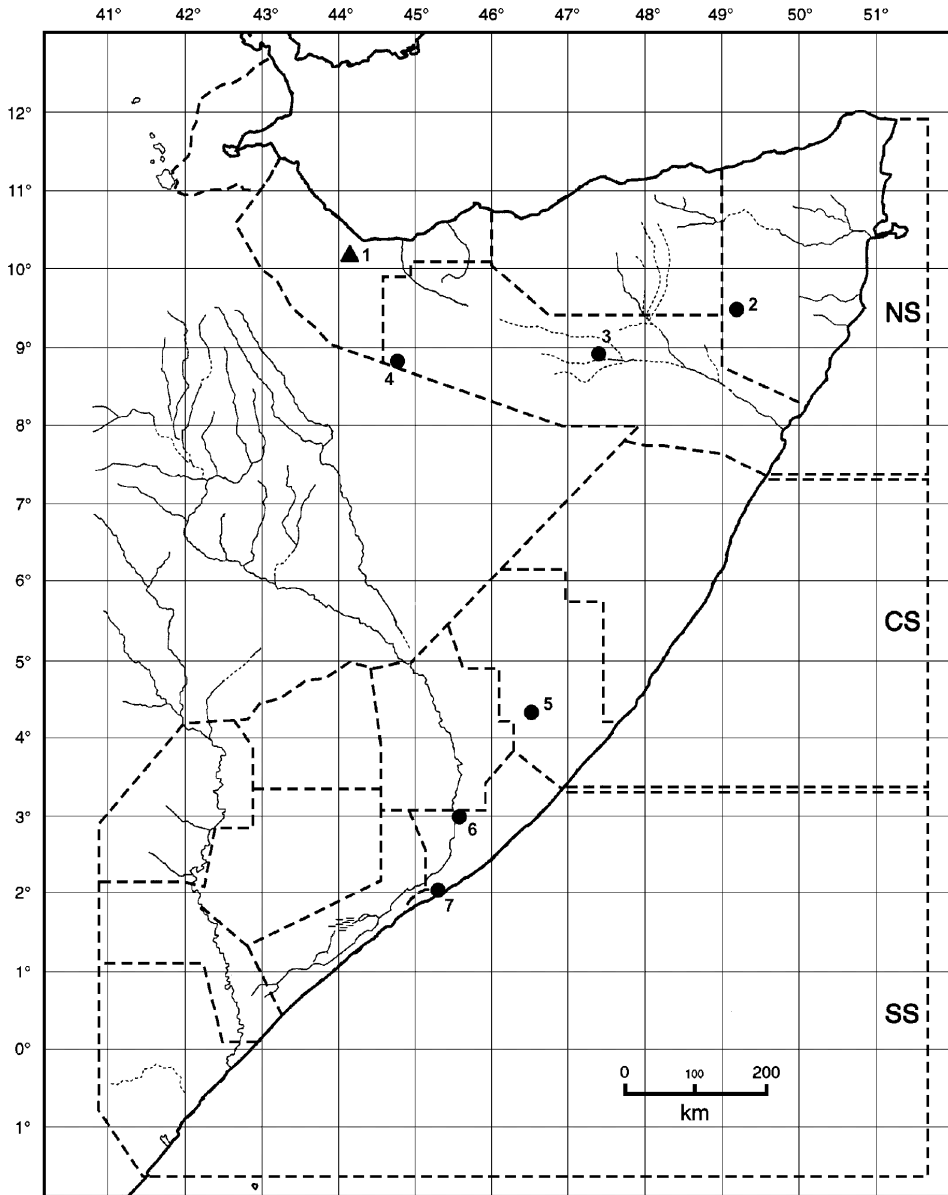


Fig. 18. — Somali distribution of *Eryx borrii* (▲, 1, Biji) and *Eryx somalicus* (●, 2, Gardò; 3, Garbaqabat; 4, Haud; 5, Bud Bud; 6, Mahaddei Uen; 7, Mogadishu).

Family Pythonidae Fitzinger 1826

According to MCDIARMID et al. (1999), the family includes the following 8 genera: *Antaresia* Wells & Wellington 1984; *Apodora* Kluge 1993; *Aspidites* Peters 1877;

Bothrochilus Fitzinger 1843; *Leiopython* Hubrecht 1879; *Liasis* Gray 1842; *Morelia* Gray 1842; *Python* Daudin 1803.

Only the genus *Python* occurs in Somalia.

Genus *Python* Daudin 1803

Python DAUDIN 1803a: 187 (type species in RUSSELL 1796: plates 24 "Pedda Poda B" and pl. 39 "Bora" (= *Coluber Molurus* Linnaeus 1758) by monotypy; see also ZHAO & ADLER 1993: 199, for details on the date of publication, and 222).

Constrictor (not of Laurenti 1768) WAGLER 1830: 168 (type species: not designated, subsequently designated as "*Constrictor Schneideri* Wagl[er]" (= *Boa Reticulata* Schneider 1801) by FITZINGER 1843: 24).

Enygrus WAGLER 1830: 166-167 (type species: not designated; subsequently designated as "*Enygrus regius* Wagl[er]" (= *Boa Regia* Shaw 1802) by FITZINGER 1843: 24).

Enygrus GRAY 1831: 97 (incorrect subsequent spelling of *Enygrus*, apparently a typographical error).

Enygris GRAY 1842: 42 (unjustified emendation of *Enygrus*).

Heleionomus GRAY 1842: 42 (type species: *Heleionomus variegatus* Gray 1842 (= *Coluber Sebae* Gmelin 1789) by monotypy).

Hortulia GRAY 1842: 43 (type species: *Hortulia Natalensis* Gray (= *Python natalensis* A. Smith 1833) by monotypy).

Asterophis FITZINGER 1843: 24 (type species: *Python Tigris* Daudin 1803 (= *Coluber Molurus* Linnaeus 1758) by original designation).

Hortalia SCUDDER 1882: 166 (emendation of *Hortulia*).

Aspidoboa SAUVAGE 1884: 143 (type species: *Python curtus* Schlegel 1872 by monotypy).

Pyton FUNAIOLI 1957: 79 (incorrect subsequent spelling of *Python*).

Derivatio nominis. The genus name derives from the Latin *Python* (masculine noun; genitive *Pythonis*): the serpent killed at Delphi by Apollo. The gender of the genus is masculine.

Content and distribution. Following MCDOWELL's view (1975), the genus should include a dozen species inhabiting: Africa S of the Sahara [*P. anchietae* Bocage 1887, *P. regius* (Shaw 1802), *P. sebae* (Gmelin 1789), *P. saxuloides* Miller & Smith 1979 from Kenya, whose validity is to be confirmed], Palaearctic Region (where *P. molurus* (Linnaeus 1758) occurs in a restricted range), Oriental Region [*P. curtus* Schlegel 1872, *P. molurus* (Linnaeus 1758), *P. reticulatus* (Schneider 1801)] and Australian Region [*P. amethistinus* (Schneider 1801), *P. boeleni* (Brongersma 1953), *P. bredli* Gow 1981, *P. carinatus* Smith 1981 from W Australia, whose validity is to be confirmed, *P. oenpelliensis* Gow 1977, *P. reticulatus* (Schneider 1801), *P. spilotos* (Lacépède 1804), *P. timoriensis* (Peters 1876)]. According to UNDERWOOD & STIMSON (1990) and KLUGE (1993b), only the African and Asiatic species, including *reticulatus* and *timoriensis*, belong to the genus *Python*, while the remaining species pertain to the genus *Morelia*.

Here we consider as belonging to the genus only 4 African species, all occurring South of the Sahara [*P. anchietae* Bocage 1887, *P. regius* (Shaw 1802), *P. sebae* (Gmelin 1789), *P. natalensis* A. Smith 1840, a full species according to BROADLEY (1999), of which *P. saxuloides* Miller & Smith 1979 should be a synonym (BROADLEY 1984)], and 4 Asiatic species living in the Palaearctic (where *P. molurus* occurs in a restricted range) and Oriental Regions [*P. curtus* Schlegel 1872, *P. molurus* (Linnaeus 1758), *P. reticulatus* (Schneider 1801), *P. timoriensis* (Peters 1876)] (cf. UNDERWOOD & STIMSON 1990, KLUGE 1993b, McDIARMID et al. 1999).

Only one species occurs in Somalia: *Python sebae*.

Fossils. RAGE (1984), in his review of fossil snakes, cited only two species of the genus *Python*: *Python maurus*, from the Miocene of Morocco, which «may not be a pythoninae» (KLUGE 1993b: 55), and *P. sardus*, from the Middle Miocene of Sardinia; KLUGE (1993b: 55) stated that this species is «maybe correctly identified to genus; however, a more detailed study on the only available material, an articulated palatine and anterior pterygoid fragment, is required to determine the presence of diagnostic features». SZYNDLAR & RAGE (2003), in their revision of the European non-erycine Booidea, assign to the genus three species: *Python euboicus* Roemer 1870 (early Miocene, Greece), *Python europaeus* n. sp. (middle Miocene, France) and the above-mentioned *Python sardus*.

Description. Large snakes, the largest of which, the SE Asiatic *P. reticulatus* has been fairly reliably recorded as attaining a total length of close to 10.5 m; head nearly as broad as body, depressed, elongate and distinct from neck; snout long, broadly rounded, without any canthus; rostral touching 6 shields, with a wedge-shaped pit on each side; mental grooved; 2-5 anterior upper labials deeply pitted; a few anterior lower labials and sometimes also some of the posterior ones from deeply to feebly pitted; snout covered with shields; upper surface of head covered with more or less symmetrical shields or small scales; nasals semi-divided and separated from each other by a pair of internasals; nostril large, placed high on the snout, directed upwards or upwards and outwards; eye moderate with vertically elliptic pupil. Body massive, cylindrical or somewhat compressed, covered with rather small, smooth scales, about 53-99 at midbody; ventrals well developed, but distinctly narrower than the body; anal entire or divided; terminations of the concealed rudimentary hind limbs seen as small claw-like processes on each side of the vent, larger in males than in females. Tail moderately long to short, prehensile; subcaudals all or mostly paired. Premaxillary toothed; palatine and pterygoid teeth scaphiodont; maxillary and mandibular teeth numerous, anodont and scaphiodont, the anterior ones strongly recurved. Hypapophyses absent over posterior part of the vertebral column.

Data on the rearing of the typical pythons are given by many authors (e.g. WELCH 1987: 81, BARKER & BARKER 1994, WALLS 1998a, FAIN 2001, VIANELLO 2002, and MCCURLEY & GLASGOW 2003).

Python sebae (Gmelin 1789) (Figs 19-30)

Coluber Sebae GMELIN 1789: 1118.

C[oluber] Speciosus BONNATERRE 1790: 17. Holotype based on pl. 199, fig. 2 in SEBA 1735. Type-locality: "Brazil", in error, according to LOVERIDGE 1957: 248.

Boa Hieroglyphica SCHNEIDER 1801: 266. Holotype based on pl. 27, fig. 1, in SEBA 1735. Type-locality: "Cairo, Egypt" by inference as taken from Seba, according to LOVERIDGE 1957: 248.

Python Houttuyni DAUDIN 1803b: 254. Type(s) unlocated. Type-locality: unknown. (Possibly synonym of *P. natalensis*).

Heleionomus variegatus GRAY 1842: 43. Holotype BMNH, no. IV. 3. 1a, presumed lost. (Possibly synonym of *P. natalensis*).

Python sebae; DUMÉRIL & BIBRON 1844: 400.

Python Liberiensis HALLOWELL 1845: 249. Holotype: ANSP 6705. Type-locality not given in original description but presumed to be "Liberia, West Africa" based on stated locality for other species described in the same paper. (Considered a synonym of *P. sebae* by HALLOWELL 1857: 66).

Boa Liberiensis HALLOWELL 1854: 100.

Python jubalis PITMAN 1936: 211. Type(s) given as in the museum at Mogadiscio, though I (C.R.S. Pitman) am unaware of any published description in the original paper. Loveridge 1957: 248, also stated that no published description was known. Type-locality: "Juba River" (nomen nudum).

Boa constrictor (not Linnaeus) LIPPARONI 1954: 655.

Python molurus (not Linnaeus) BELLAIRS 1969: pl. 30.

[Python] sebae sebae BROADLEY 1983: 68.

Derivatio nominis. The species name derives from the genitive (*Sebae*) of the latinized family name *Seba*, as the species was named by J.F. Gmelin in honour of the Dutch naturalist Albertus Seba (Etsel, E Friesland, now in NW Germany, May 2, 1665 — Amsterdam, May 2, 1736). «A merchant by profession, Seba possessed the largest collection of natural history objects of his era» and «published a colossal four-volume work, in folio, to describe his two collections, the famous "Locupletissimi Rerum Naturalium Thesauri [...]". The text is mediocre, but the 449 outstanding plates figure literally thousands of specimens in life size, including an especially large number of reptiles and amphibians, which form the largest part of volumes 1 and 2, issued in 1734 and 1735.» (ADLER 1989: 9).

Ethnozoology. At least the big specimens of *Python sebae* are widely feared in Somalia especially because of their potential to kill by constriction.

Somali records. Alessandra Island (BROADLEY 1984: 362); Arbidin (pond of), along the lower Shebelli River (TEDESCO ZAMMARANO 1924: 158, tracks, 18.II.1922; TEDESCO ZAMMARANO 1930: 206, leg. V. Tedesco Zammarano, 3.II.1922); Bardera (BOULENGER 1909b: 311, 1 spec. 30025 MSNG, leg. U. Ferrandi, 1908); Bardera (north of) (STEFANINI 1922: 210, uncertain sight record); Belet Amin (SCORTECCI 1939a: 270, 5 spec. MSNG, leg. S. Patrizi, [VI-VIII].1934); Ciula Island (GROTTANELLI 1955: 5); Comia (environs of), near the Shebelli River (TEDESCO ZAMMARANO 1924: 125-126, tracks, 30.I.1922, 128, fig. p. 129, fig. p. 130, 1 spec., leg. V. Tedesco Zammarano, 30.I.1922, and pp. 138-139, 1 spec., leg. V. Tedesco Zammarano, 3.II.1922; 1930: 165, tracks, 30.I.1922, 168, fig. p. 169, 1 spec., leg. V. Tedesco Zammarano, 30.I.1922, and pp. 180-182, leg. V. Tedesco Zammarano, 3.II.1922); ex Italian Somalia (ANONYMOUS 1933: 63; TESTI 1935: 106, 115; SCORTECCI 1936: 922); Gelib [= Jilib] (BROADLEY 1984: 362); Giohàr (LANZA 1968: unnumbered fig. of columns 239-240, 1 ♀ MZUF 5154, leg. SBS, 26.IV.1968; BROADLEY 1984: 362); Jilib (= Gelib), near the Juba River (RALLO 2000: 287-288, 1 unsexed skin MSNV CCC4962, leg. N. Forin, 1956); Kismayu (RALLO 2000: 287-288, fig. 2, 1 unsexed skin MSNV CCC4963, leg. D.E. Ancilotto, 1952); Labadaad and Bulu Yaag (= Yaaq) (between) (JOHNSON 1981: 1, 1 ♀, 27.VII.1978; HOEVERS & JOHNSON 1982: 184, 1 young ♂ MZUF 27044, field number 72112, 14.VII.1978, 1 young ♀ MZUF 27045, field number 72070, 28.V.1978, 1 young ♀ CAS 153324, field number 72299, 8.V.1979, 1 young ♂ CAS 153325, field number H 0892, 10.II.1980); Lugh Guddèi peninsula (very common; less common at Lugh than in the forests along the lower Shebelli River) (FERRANDI 1903: 73); Manamofa (BROADLEY 1984: 362); Mareri (BROADLEY 1984: 362); Middle Shebelli River (LIPPARONI 1954: 655); Mogadishu (GESTRO 1932: 10); Nogal (CORONARO 1926: 32, 1 spec. 31899 MSNG, donated by G. Lagorio); Ola Uager (SCORTECCI 1939a: 270, 2 spec. MSNG, leg. S. Patrizi, 18.VIII.1934); Shebelli and Juba rivers (along) (SCORTECCI 1937: 265, SIMONETTA & MAGNONI 1986: 424); Shebelli

River (regions south of the) (BALLETO 1968: 267); Somalia (FUNAIOLI 1957: 79, pl. XXIV, fig. 4; LAPINI 1984: 48, 1 spec. MFSN 175, donated by S. Costantini); Somalia (southernmost parts of) (BALLETO 1968: 225); Somalia (watered districts in the south of) (PARKER 1949: 28); Southern Somalia (regions Middle Shebelli, Mogadishu, Bay, Lower Shebelli, Gedo, Middle Juba, and Lower Juba) (LANZA 1983: 221; LANZA 1990: 432); Upper Bubasci (along the), near Ola Uager (PATRIZI 1935: 22, 22.VIII.1934).

Material studied. Fourteen specimens have been examined from the following localities: Alessandra Island (2 young ♂♂ MZUF 2214 and 2216, 3 young ♀♀ MZUF 2202 and 2215 sent in exchange to the Universidade Federal de Rio de Janeiro, Brazil, MZUF 2217 sent in exchange to the Instituto Butantan, São Paulo, Brazil, leg. SBS 1962 and natives, 14.VIII.1962, No. 2202, other 15.VIII.1962); Giohàr (1 young ♂ MSNM 802, ex 2120, leg. U. Fiechter, 1936; 1 young ♀ MZUF 3972, leg. SBS 1964 and a native; 1 ad. ♀ MZUF 5154, leg. SBS and a native, 26.IV.1968; 1 young ♀ MZUF 5653, leg. SBS, Ettore Granchi, 3.VIII.1970); Jilib (1 young ♀ MZUF 18483, leg. a native, donated by G. Tarabini Castellani, 22.IV.1971; 2 adult, unsexed specimens, head only, MZUF 21651 and MZUF 21663, leg. natives, donated by G. Tarabini Castellani, 1970); Labadaad (00°30'N 42°46'E) and Bulo Yaag (00°12'N 42°46'E) (= Yaaq) (between) (1 young ♂ MZUF 27044, field number 72112, and 1 young ♀ MZUF 27045, field number 72070, leg. L.G. HoEVERS and P.M. Johnson, 14.VII.1978 and 28.V.1978, respectively).

Description (see also *Description* of the genus) (Figs 19-29).

Morphology. Head subtriangular, elongate, flattened, well distinct from the neck; snout narrowly rounded. Body slender in juveniles, becoming more and more stout with age, slightly depressed in the big animals, otherwise cylindrical; in the environs of Comia, near the Shebelli River (Somalia), TEDESCO ZAMMARANO (1924: 139) killed a fasting specimen 5.72 m long with a midbody circumference of 41 cm. A ♀ 4.45 m long, found dead between Labadaad and Bulo Yaag (lower Juba Valley), had a girth of 46 cm (JOHNSON 1981, and HOEVERS' unpublished notes). The greatest, seemingly trustworthy total length known thus far is, 9.80 m (9.81 m in POPE 1961, for the same specimen), attained by a specimen killed in a garden hedge at Bingerville (05°21'N 03°54'W; Ivory Coast), measured by CH. BÉART in 1932 (in litt. to Villiers: VILLIERS 1950, 1975); however SPAWLS et al. (2002), agreeing with BRANCH (1984), considered this record «an anecdotal report (without any tangible evidence) [...] and a slightly more credible record of a 7.5 m specimen from a research station, also in Ivory coast, but again evidence is lacking». STUCKI-STIRN (1979: 50), according to whom the pythons found near habitations are usually smaller than snakes taken in remote areas, regarded as a very important specimen an animal 7.85 m long, found in Cameroon (Mt Ali). STARIN & BURGHARDT (1992: 53) stated that in Gambia «During the systematic field study 52 python sightings were made on 45 different occasions. The pythons ranged in size from .5 m to about 7.5 m in total length. Based on 50 sightings, the median and modal total length was 3 m with a mean of 3.3 m (sd = 1.3); 20% of the sightings were of animals greater than 4.5 m». However, there is considerable variation in weight according to condition and sex, the females being proportionately heavier than the males. Tail moderately long, prehensile, about 11 to 16% of the total length in males and 9 to 14% in females, usually terminating with a sharp, almost spiny point; its growth seems to be isometric since we found similar percentage values in two freshly killed Somali females with a total length of 1055 and 3970 mm, 10.43% and 10.93%, respectively. Rostral about as broad as deep, visible from above, with an elongate oblique pit on either side of its apex. Nostril

large, placed high on the snout, directed upwards and outwards; nasal semidivided. Eye moderate, obliquely positioned as seen in dorsal view and much exposed;

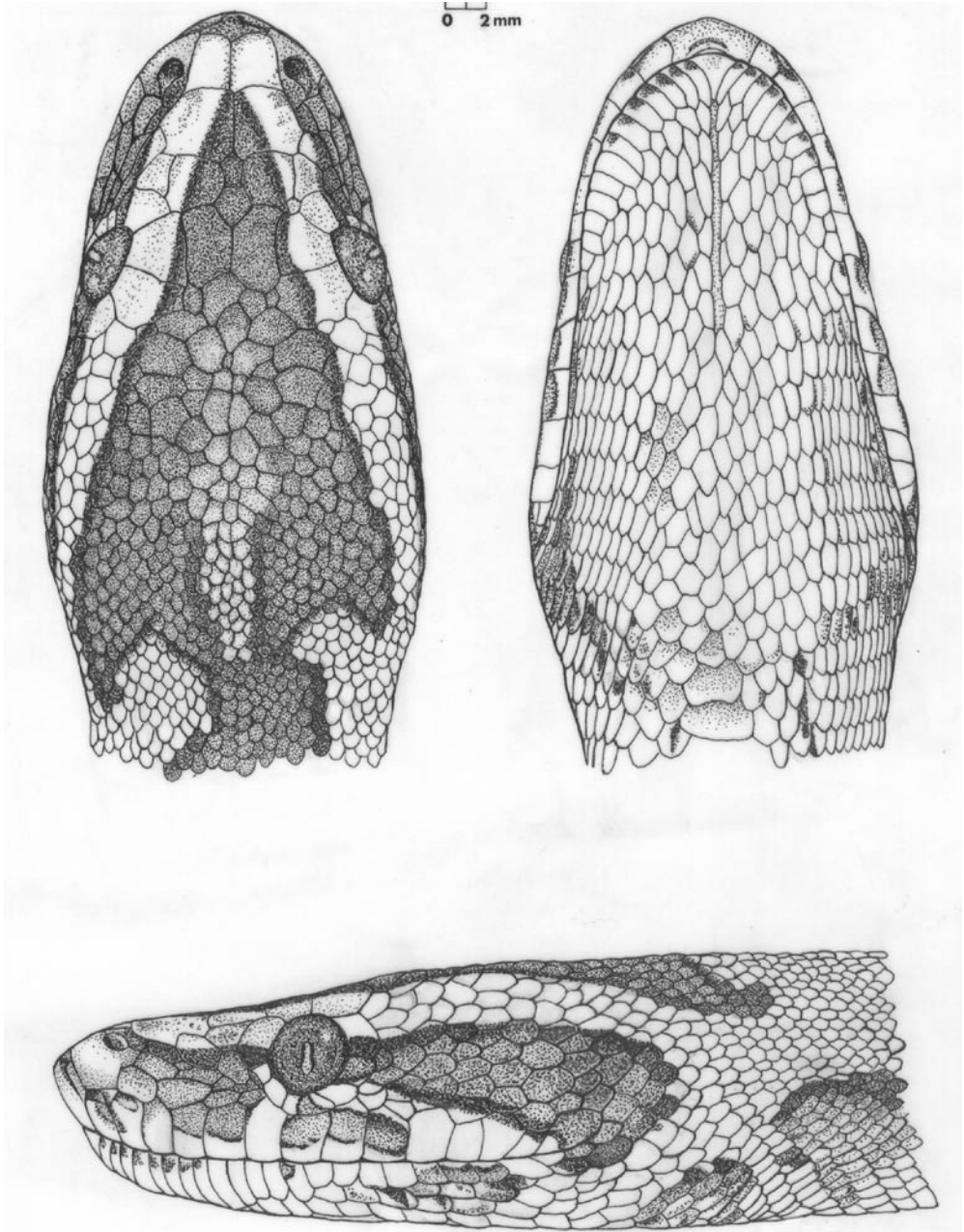


Fig. 19. — Head and neck of *Python sebae* young ♀ MZUF 27044 found between Labadaad and Bulo Yaag; dorsal, ventral and lateral view (drawing by Manuela Mascherini).

pupil vertically elliptic, readily distinguishable in live specimens; iris brownish. Two subrectangular internasals 1.5 times as long as broad or a little shorter, followed by a pair of large anterior prefrontals and a pair of smaller posterior prefrontals, the latter partly or completely separated by 1-3 azygous shields (interprefrontals). Usually a pair of more or less lengthened frontals (which may be fused). Supraocular large, irregularly shaped, broken up into two or more shields, usually two. Frontals and supraoculars followed by a variable number of unequal, irregularly arranged shields. Posterior third or fourth of the head upper surface covered by scales similar to those of the back, larger in front and gradually merging backwards into those of the body. About 8-16 loreals, disposed in 2-3 irregular rows; 5-13 circumorbitals (usually 6-10) made up of 1-2 supraoculars, 2-3 preoculars (a large upper and 1-2 smaller ones below), 1-2 suboculars, and 1-3 postoculars (the upper one the largest); 11-17 upper labials, always separated from the eye, the first two deeply pitted; 15-25 lower labials, the anterior and posterior ones respectively with 2-6 and 3-7 small, shallow pits near their upper margin [in two specimens from central Africa LAURENT (1956) found the following lower labial pit formulae: 2-3 + 12-15 in a juvenile and a male (another ♂ and another 2 ♀♀ cited by him proved to be *P. natalensis*; D.G. BROADLEY pers. comm., VI.2004); in five specimens of both sexes from the Virunga National Park (Democratic Republic of Congo) DE WITTE (1975) found the following formulae: 2-3 + 16-19, 1-3 + 16-19, 2-4 + 17-19, 2-5 + 15-17, and 2-4 + 15-18; MADERSON'S (1970) data are incomplete: «There are pits in the first two supralabials, and the last four infralabials, although the fourth is much smaller than the others»; for data on Somali specimens see Table 5]; body covered by rather small, smooth scales, 71-99 at midbody (respectively about 66-77 and 43-54 rows a head length behind the occiput and anterior to the cloaca); ventrals 259-294; anal entire, rarely divided; 55-81 subcaudals all, or for the most part, in two rows. The dorsal scale microdermatoglyphics have been described by PRICE & KELLY (1989).

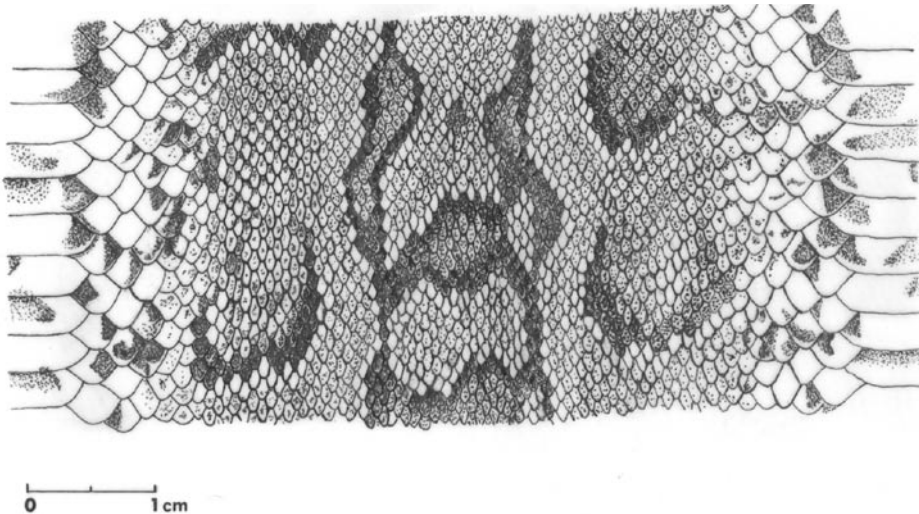


Fig. 20. — Midbody view of *Python sebae* young ♀ MZUF 27044 found between Labadaad and Bulo Yaag (drawing by Manuela Mascherini).

ALEXANDER & GANS (1966) found in one specimen 278 (ventral) and 606 (dorsal) body scale rows, > 78 (ventral) and > 109 (dorsal) tail scale rows, 283 body and > 75 tail vertebrae and the following dermal-vertebral ratios: ventral body 1:1, dorsal body 2.1:1; ventral tail 1:1, dorsal tail 1.5:1.

The hemipenis is heavy, bilobed with a projection (awn) at the tip of each lobe, and provided with a strong flounce on the stem and a sulcus spermaticus bifurcating beyond half the length of the organ; its surface is tomentose but spineless (DOUCET 1963: 227, pl. VII, figs E-F [but B, A on plate]; WALLS 1998a).

On each side 2 premaxillary, 13-16 maxillary (16-18, LEESON 1950; 22, EDMUND 1969; 17, CHIPPAUX 2001), 6 palatine (7, EDMUND 1969; 8, LEESON 1950), 8-9 pterygoid (10 LEESON 1950; 9-10 EDMUND 1969), and 13-17 mandibular teeth (Edmund's and Chippaux's data obtained from their figs of the skull). The bones of the skull were studied in detail by FRAZZETTA (1959, 1966).



Fig. 21. — *Python sebae* ♀ MZUF 5154, about 4 m long, from Gihòr (photo by Benedetto Lanza).

Table 5.

Python sebae: number and position of the lower labial pits.

Number	Sex	Anterior sublabial pits		Posterior sublabial pits	
		No. of pits: left/right	Position of pits: left/right	No. of pits: left/right	Position of pits: left/right
MSNM 802	♂	3/3	2-4/2-4	3/4	14-16/15-18
MZUF 2214	♂	3/3	2-4/2-4	5/3	12-17/15-17
MZUF 2216	♂	4/4	2-5/2-5	6/5	14-19/14-18
MZUF 27044	♂	3/3	2-4/2-4	7/6	14-20/15-20
MZUF 2202	♀	4/3	2-5/2-4	4/4	14-17/14-17
MZUF 3972	♀	4/4	2-5/2-5	6/5	14-19/14-18
MZUF 5653	♀	3/3	2-4/2-4	4/4	14-17/14-17
MZUF 18483	♀	3/3	2-4/2-4	4/?	15-18/ ?
MZUF 27045	♀	3/4	2-4/2-5	5/5	15-20/15-20
MZUF 21651	?	3/3	2-4/2-4	5/5	13-17/14-18
MZUF 21663	?	4/4	2-5/2-5	3/4	15-17/15-18

The characters of the Somali specimens studied by us are shown in Table 6 and Appendix 1.

In the young Somali ♀ MZUF 27045 (in alcohol; skull not prepared!) we counted on each side respectively 2 and about 13, 7, 8, 16 premaxillary, maxillary, palatine, pterygoid and mandibular teeth.

The negative allometric growth of the eye is shown in Table 7.

Colouration. Background greyish to pale brown or tan above, with more or less sinuous dark brown, black-edged saddles, which are variable in shape and size and often connected by a discontinuous dark stripe running along each side of the back. A most unusual specimen with a partially striped dorsum was described by WALLS (1998a: 171), according to whom «Striping frequently is not genetic but instead is caused by cool temperatures during incubation»; colour and pattern mutations, all obtained in captivity, include patternless and hypomelanistic individuals, as well as various forms of aberrant striping that may or may not be genetic (MCCURLEY & GLASGOW 2003); a patternless animal is portrayed in VIANELLO (2002). General colour of the sides lighter, finely dark dotted and with irregular, more or less vertical or subvertical spots, sometimes fused with the dorsal ones and becoming more or less irregularly C- to U-shaped, with the open side anteriorly, about from midbody cephalad; the lateral spots are more sharply defined behind, becoming gradually less distinct on the anterior part of the body. Upper surface of tail with a continuous light to golden-yellow stripe between two black ones; this stripe may extend well forward onto the body as a continuous or interrupted vertebral light stripe. A large arrowhead-like dark brown blotch occupies the top of the head, bordered on each side by a light stripe beginning at the end of the snout, above the nostril, and passing above the eye; head lateral and ventral pattern clearly dif-

Table 6.

Python sebae: characters of the Somali specimens studied

Character	Sex	n	Range	Mean	cl (99%)
TaL%	♂♂	4	12.51-12.87	12.65±0.078	12.19-13.10
TaL%	♀♀	7	10.43-13.75	12.03±0.431	10.44-13.63
RR	♂♂+♀♀	8	1.02-1.30	1.16±0.032	1.05-1.27
IPPF	♂♂+♀♀	11	1-3	1.91±0.211	1.24-2.58
CO left	♂♂+♀♀	14	5-9	7.71±0.345	6.68-8.75
CO right	♂♂+♀♀	12	5-9	7.58±0.398	6.34-8.82
UL left	♂♂+♀♀	14	13-16	14.00±0.210	13.37-14.63
UL right	♂♂+♀♀	14	12-16	14.00±0.277	13.16-14.83
LL left	♂♂+♀♀	12	19-23	21.33±0.414	20.04-22.62
LL right	♂♂+♀♀	11	20-23	21.73±0.359	20.59-22.87
MSR	♂♂+♀♀	12	82-92	87.00±0.739	84.71-89.29
NS	♂♂+♀♀	9	63-71	67.33±0.882	64.37-70.29
PC	♂♂+♀♀	9	44-46	44.78±0.278	43.85-45.71
V	♂♂+♀♀	11	270-280	275.18±0.923	272.26-278.11
VD	♂♂+♀♀	11	270-280	275.18±0.923	272.26-278.11
SC	♂♂+♀♀	10	65-74	68.90±0.971	65.74-72.06
SC	♂♂	4	67-74	71.50±1.555	62.42-80.58
SC	♀♀	6	65-69	67.17±0.601	64.74-69.59

Abbreviations: cl = confidence limits; CO = number of circumorbital scales; IPPF = number of interprefrontals (i.e. number of scales between posterior prefrontals); LL = lower labials; MSR = numbers of longitudinal rows of scales at midbody; NS = number of longitudinal rows of scales behind the occiput; PC = number of longitudinal rows of scales a head length anterior to the cloaca; RR = rostral width/rostral depth; SC = number of subcaudals; TaL% = tail length x 100/total length; UL = upper labials, supralabials; V = number of ventrals according to the "wider than long system", i.e. of pseudoventrals + true ventrals; VD = number of ventrals according to the "Dowling system", i.e. of the true ventrals.

Table 7.

Negative allometric growth of the eye in *Python sebae*.

Sex	SnL	EHD	SnL/EHD
♂	13.50	5.00	2.70
♀	13.60	4.90	2.78
♀	13.60	4.80	2.83
♀	13.80	4.80	2.88
♂	14.00	5.10	2.75
♂	14.10	5.10	2.76
?	29.40	7.40	3.97
?	46.10	8.90	5.18

Measures (in mm); SnL = snout length, i.e. distance between snout tip and eye; EHD = horizontal eye diameter.



Fig. 23. — *Python sebae* young ♀ MZUF 5653 from Giohâr; preserved specimen; head and neck, dorsal view (photo by Benedetto Lanza).



Fig. 25. — *Python sebae* young ♀ MZUF 27045 found between Labadaad and Bullo Yaag; preserved specimen; head and neck, dorsal view (photo by Benedetto Lanza).

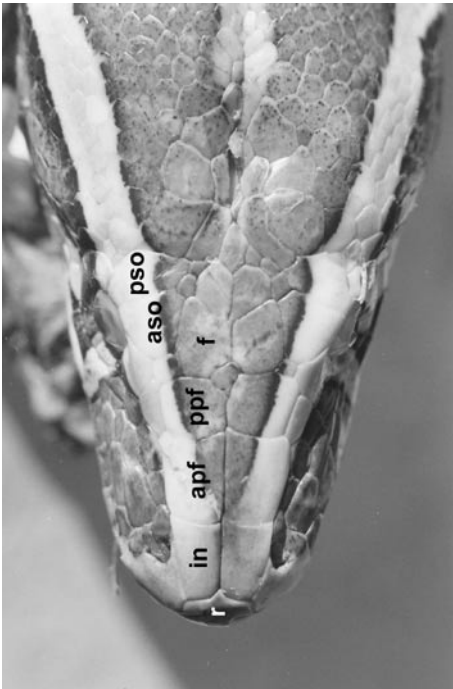


Fig. 22. — *Python sebae* unsexed specimen MZUF 21651 from Jilib; preserved head; head, dorsal view: *r*, rostral; *in*, internasal; *apf*, anterior prefrontal; *ppf*, posterior prefrontal; *f*, frontal; *aso*, anterior supraocular; *pso*, posterior supraocular (photo by Benedetto Lanza).

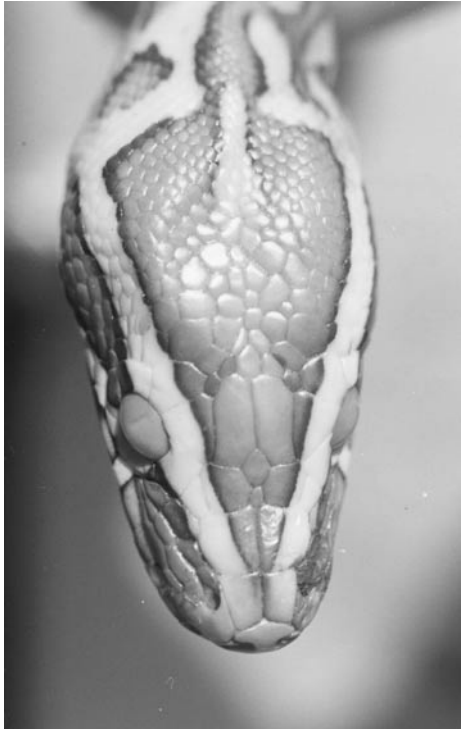


Fig. 24. — *Python sebae* young ♀ MZUF 2202 from Alessandra Island; preserved specimen; head and neck, dorsal view (photo by Benedetto Lanza).

ferent from that of *P. natalensis* (BROADLEY 1984): a diagonal pale stripe between nostril and 2nd upper labial, followed by an extensive preocular dark patch; a large pyriform dark postocular patch, broader than the eye diameter posteriorly; a large subocular subtriangular or irregular dark patch, occasionally confluent with the preocular and/or the postocular dark patch; head always immaculate white ventrally, usually with solid dark markings on the lower labials and large dark blotches on the throat. Underparts white, profusely spotted and dotted with dark brown to black posteriorly to the throat, the light colour predominant on the median line; subcaudal surface irregularly dark-mottled and, according to BROADLEY (1984), without the continuous light median line occurring in *P. natalensis* (but such a line exists, at least in the basal part of the tail of the individual figured in DOUCET (1963: 226, plate V); as its provenance is unspecified, it *could not be* from Ivory Coast, therefore possibly a *P. natalensis*). Good colour illustrations of the species may be found in PITMAN (1938, 1974), KUNDERT (1974) and WALLS (1998a; also an unusual pattern variant).

The eggs are large: on average they measure approximately 10 cm in length and weight about 150 g; when first laid, they are soft, oval to sub-elliptic in shape and ashy grey to ivory white in colour; on exposure they soon become almost spherical, firm and clear white in colour; later they become leathery and turn to a dirty creamy white shade. However, the egg size may be smaller: measurements of 13 eggs made by BARKER & BARKER (1994) ranged from 7.4-7.9 cm in length (average 7.6 cm) and 5.8-6.3 cm in diameter (average 6.1 cm). Their shell is pergameneous, finely granulous and, as in the other pythons, its calcareous material is formed into columns that penetrate deeply into the membrane; the calcium carbonate usually consists of calcite crystals, but in some species, e.g. in *Python regius*, aragonite crystals are interspersed among the calcite ones (PACKARD & PACKARD 1994). Soon after the eggs are laid, they tightly adhere to each other and become very difficult to separate without tearing the shells (STAFFORD 1986).

Distribution. Africa south of the Sahara from Senegal east to southern Sudan, Eritrea, Ethiopia and Somalia, including Guinea-Bissau, southern Mali, Guinea, Sierra Leone, Liberia, Ivory Coast, Burkina Faso, Ghana, Togo, southern Niger, Nigeria, Cameroon, Equatorial Guinea, southern Chad, Central African Republic, Congo Republic, Democratic Republic of Congo, Uganda, northern Angola, Rwanda, Kenya, and Tanzania (see also BROADLEY 1984, and BROADLEY & HOWELL 1991). In Kenya, *P. sebae* occurs at relatively low altitudes in the Lake Victoria basin to the west and in the eastern coastal lowlands, being replaced by *P. natalensis* on the Kenya highlands (BROADLEY 1999).

According to KÁDÁR (1977: 44), Diodorus Siculus (1st century BC) «relates of the Libyan amazones; speaking of the armour of the belligerent people he mentions the fact that they use as defensive armour the skins of great snakes (most probably shields made of the skins), which occur in great number in Libya; most likely he thinks here of the *assala* [the usual Arabic name of the python] (*Python sebae*) [...]». Also the giant snake, whose capture is vividly described by Diodorus Siculus, who derived his data from Agatharchides of Cnidus (2nd century BC; cf. BODSON 2003), was almost surely a *Python sebae* (cf. VOGEL 1996: 86). It had a length of 30 cubits, i.e. of 13.2 m, almost surely an overestimated figure; this animal, collected in "Aithiopia" (at present corresponding to an area situated between most of Sudan and northern part of modern Ethiopia) was donated to Ptolemy II, King of Egypt, and lived in his Alexandria palace. KÁDÁR (1978), after a zoological evaluation of



Fig. 26. — *Python sebae* young ♀ MZUF 2202 from Alessandra Island; preserved specimen; head and neck, side view (photo by Benedetto Lanza).



Fig. 27. — *Python sebae* young ♀ MZUF 5653 from Giohàr; preserved specimen; head and neck, side view (photo by Benedetto Lanza).

the north-western African Roman mosaics (ca 2nd to 4th century AD), points out the details of zoogeographical changes, like the extinction of numerous Afrotropical elements, e.g. large mammals, ostrich and *Python sebae*, having taken place in historical times; a mosaic found near Carthage represents a python struggling with an African elephant. Another two big snakes, presumably *P. sebae*, are portrayed in the upper level of the famous Nile mosaic of Palestrina (near Rome; 2nd century BC); one is coiling around a rocky outcrop, the other, in ambush on the Nile bank, has just caught a bird in its mouth (BODSON 2003). However, the species still occurred in the Saharian S Algeria at least at the beginning of the 20th century (ANGEL & LOTHE 1938).

Seba's python rarely extends to altitudes much above 2000 m (LARGEN & RASMUSSEN 1993).

Geographical variability. The species seems to be only moderately variable, but large-scale research on the topic is lacking; some anomalous colourations and patterns obtained in captivity have been mentioned under Colouration.

Biology (see also under *Python*, Biology). BROADLEY validated *P. natalensis* at the subspecific level in 1983 and 1984, but at the specific level only in 1999. Consequently, before 1983-1999 the natural history of *P. sebae* was not distinguished from that of *P. natalensis* and at present, it is possible to discriminate among the available data only when the provenance or other relevant details of the studied



Fig. 28. — *Python sebae* young ♂ MZUF 2216 from Alessandra Island; preserved specimen (photo by Benedetto Lanza).

material are indicated. Unless otherwise stated, information given in this paragraph usually refers to or may apply also to the "true" *P. sebae*. As pointed out by STARIN & BURGHARDT (1992), despite their notoriety, the natural history, ecology, and behaviour of large free-ranging snakes in native habitats are so poorly known that, the most "sustained" treatment of African rock python natural history is to be found in a popular book by F.W. FITZSIMONS (1930), but this refers to *P. natalensis*.

Python sebae is a rather sedentary, euryokous, good tree-climbing and markedly hygrophilous species widespread in a great variety of sub-Saharan habitats but seldom if ever occurring far from permanent water. In Somalia it has been found in many different ecosystems which, according to the geobotanical map published by PICHI-SERMOLLI (1957), are characterized by the following types of vegetation: broken xerophilous open woodland; xerophilous open woodland; lowland evergreen thicket and scrub; lowland dry evergreen forest; lowland moist evergreen forest; riparian formations. Though not yet confirmed, its occurrence in Nogal (cf. LIPPARONI 1954, under Somali records) is very likely since this particularly arid region of northern Somalia is crossed by the Wadi Nogal, a watercourse almost always dry but with numerous perennial pools, some of which are relatively large and deep, surrounded by thick riparian formations, inhabited by helmeted turtles [*Pelomedusa subrufa* (Lacépède 1788)] and assiduously frequented by potential prey like flocks of sheep and goats. STARIN & BURGHARDT (1992: 53-54, table 2), who carried out a study in Gambia, wrote: «Neglecting relative area, most animals were found in the clearing, with the tree and shrub savanna the second most popular

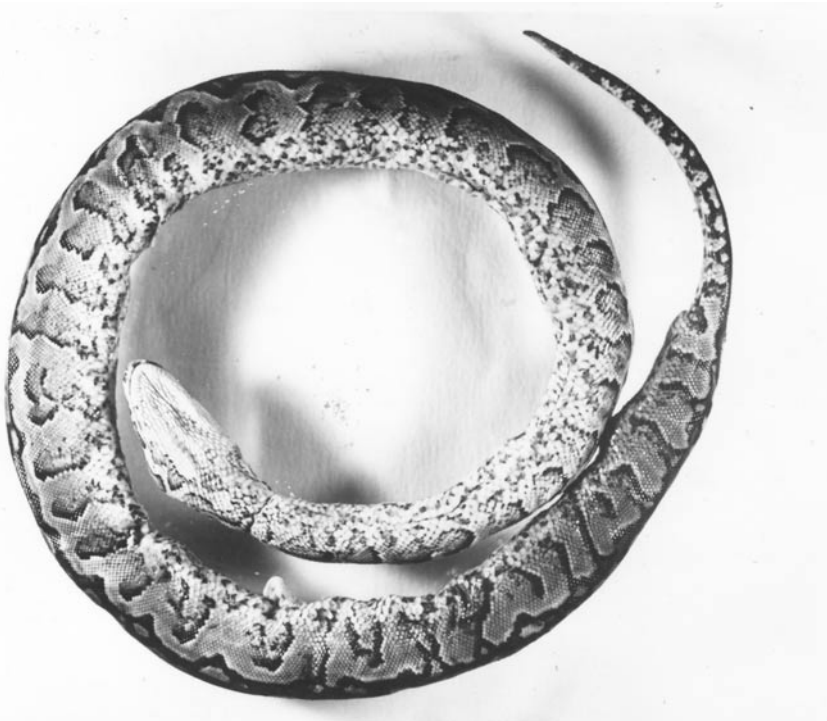


Fig. 29. — *Python sebae* young ♀ MZUF 2202 from Alessandra Island; preserved specimen (photo by Benedetto Lanza).

area, and the woodland savanna the least popular [...]. If the number of snakes is adjusted by the relative area of the habitats in the reserve, the relative popularity of habitats is even more marked [...]. The preference for the clearing was thus much stronger than even the table suggests, since the clearings make up less than 1% of the total habitat yet contributed 40% of all python observations». *Python sebae* is also rather frequent near or even within residential areas, where its presence is often completely overlooked because of its unobtrusive and largely nocturnal habits. Being excellent swimmers, Seba's pythons spend a lot of time in water, in which they may lie submerged with only the nostril and eyes exposed above the surface, often waiting for prey close to the bank. Because of their swimming ability they are probably able to cross sea stretches of some kilometers, which could explain possibly allochthonous occurrence on the small coastal Ciula Island (Bajuni Islands; S Somalia). PAKENHAM (1983: 22), dealing with the herpetofauna of Zanzibar and Pemba islands, wrote: «Once one was killed near Pemba's east coast but I never heard of another wild python in Pemba and suspect this one was escaped [...] or else had crossed the strait from mainland Africa». Juveniles are perhaps more terrestrial (STAFFORD 1986). They are usually nocturnal, but will bask and hunt opportunistically during the day; when inactive, they shelter in holes, especially aardvark [*Orycteropus afer* (Pallas 1766)], warthog [*Phacochoerus aethiopicus* (Pallas 1766)] and porcupine [*Hystrix* Linnaeus 1758] burrows, in thickets, reedbeds, up a tree, in a rock fissure or under water, often curled up in a heap of coils, with the head resting on top (SPAWLS et al. 2002).

Python sebae's diet consists mainly of warm-blooded animals, which it may also prey upon at night, guided by the heat receptors situated in its rostral and labial sensory pits; reptiles, amphibians and fishes are also occasionally eaten. Some dietary records are quoted hereunder. SCHMIDT (1923; Democratic Republic of Congo): a specimen had eaten a rat, and another one, whose size is not reported, a female antelope measuring 1040 mm in length and 480 mm high at the shoulder (personal communication by HERBERT LANG). LIPPARONI (1954; Somalia): sight record of a specimen caught swallowing a big *Naja Laurenti* 1768 sp. [probably a *Naja nigricollis* Reinhardt 1843]. PITMAN (1958: 103): «On an island in Lake Victoria, near Kisumu (Kenya), Meinertzhagen and a companion watched a huge python, which he eventually shot, high up in the trees swallowing the nestlings of *Anhinga* and *Phalacrocorax* [...] Mr E. Wilson (in litt.) caught a small python at a large, dry-season *Quelea* roost in the Sudan which disgorged about six *Quelea*» [...] in the permanent freshwater swamps in the flood area of Sierra Leone the python preys on various waterfowl as the African jacana [*Actophilornis africanus* (Gmelin 1789)] and the pigmy goose [*Nettapus auritus* (Boddaert 1783)]. CANSDALE (1961: 19): «Pythons occasionally swallow porcupines. In 1948 the Dublin Zoo received an African Python 12 ft [= ca 3.65 m] long which had been in captivity for three months. A year after arrival it passed several long quills among its dropping, showing that it had swallowed a porcupine over 15 months earlier». PITMAN (1962) reports as prey: the Guinea-fowl [*Numida meleagris* (Linnaeus 1758)], sparrow weaver [*Ploceopasser superciliosus* (Cretzschmar 1827)], rock bantam [*Ptilopachus petrosus* (Gmelin 1789)], and an unidentified Ploceidae in Sudan; Egyptian goose [*Alopochen aegyptiacus* (Linnaeus 1766)], in Kenya. GRUSCHWITZ et al. (1991) mention as prey in Gambia the bushbuck [*Tragelaphus scriptus* (Pallas 1776)]; in the same country, near or within the small zoo of the Abuko Nature Reserve, STARIN & BURGHARDT (1992) ascertained predation on an unidentified caged *Gazella* Blainville, 1816 sp., bushbuck, patas [*Erythrocebus patas* (Schreber 1775)], Temminck's western red colobus [*Procolobus badius temmincki* (Kuhl 1820)], and

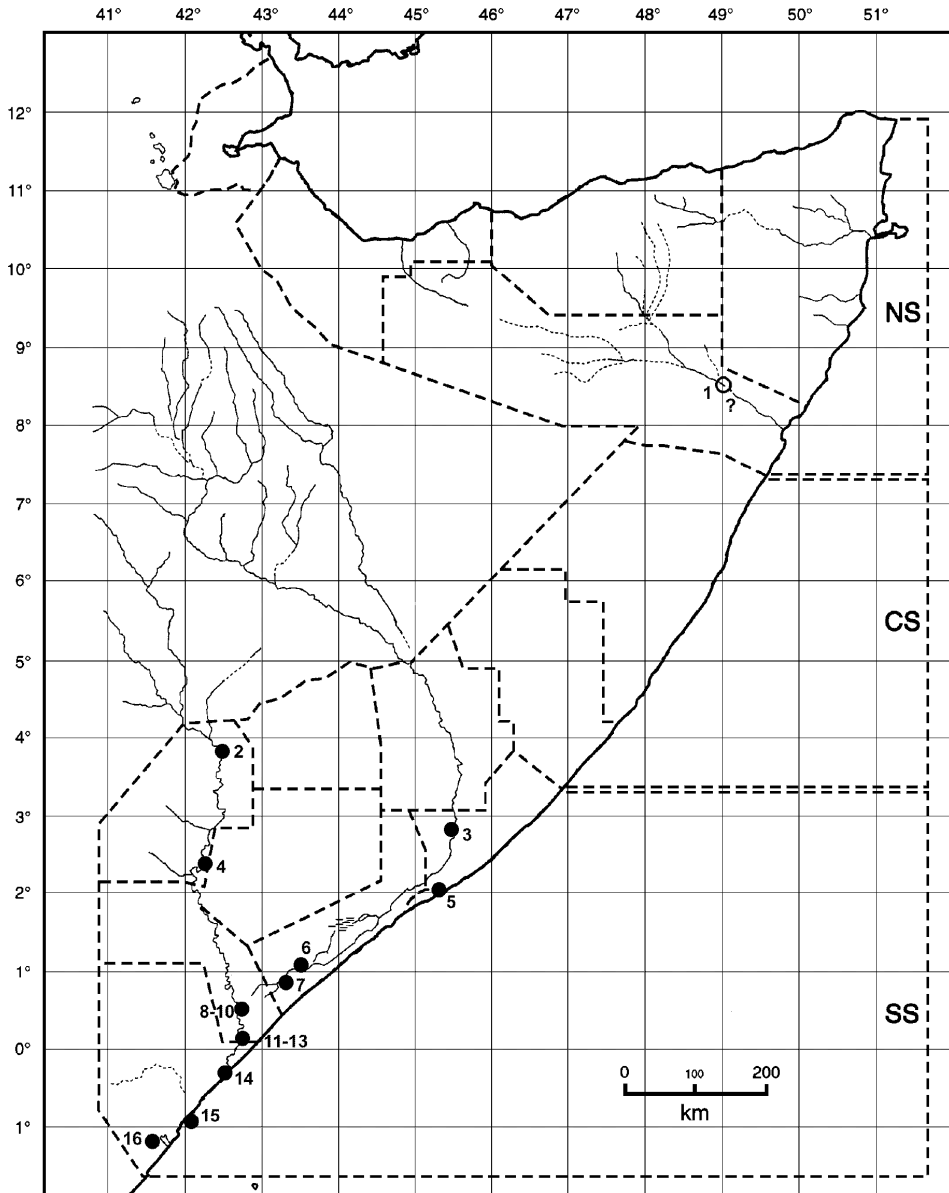


Fig. 30. — Somali distribution of *Python sebae*. The empty circle refers to an undefined locality and indicate the approximative geographical centre of a more or less wide area. 1, Nogal [according to the natives (CORONARO 1926), but not seen by the author]; 2, Lugh; 3, Giohâr; 4, Bardera; 5, Mogadi-shu; 6, Comia; 7, Arbidin; 8, Labadaad (= Alessandra Island); 9, Jilib; 10, Mareri; 11, Bulu Yaag; 12, Belet Amin; 13, Manamofa; 14, Kismayu; 15, Ciula Island; 16, Ola Uager.

green monkey [*Cercopithecus aethiops* (Linnaeus 1758) sensu lato]. GREENE & MINTON (2002: 185, caption of the lower fig.): «[...] (*Python sebae*), which habitually feeds on ungulates, including Thomson's gazelle [*Gazella thomsoni* Günther 1884] and even larger antelopes like the kob [*Kobus kob* (Erxleben 1777)] and impala». SPAWLS et al. (2002: 310): Seba's pythons «[...] eat a range of prey. Juveniles will take small mammals, birds and frogs, moving to larger mammals; adults in game areas are significant predators on antelope such as impala, duiker, kob and gazelle and the young of larger species such as waterbuck. Other known items include fish, lizards, including monitors [*Varanus*], warthogs, monkeys, crocodiles, baboons, hyrax, spring hares [*Pedetes capensis* (Forster)], porcupines, various game and waterbirds, including pelicans; they will raid chicken runs and rabbit hutches and in farming areas they will take goats and sheep». When hunting, pythons usually sneak up on the prey but when near it stop and lie in ambush, violently projecting forward only when the intended victim enters within their striking distance. The prey is usually seized by the neck and, as it is pulled back, the snake forms coils that snap shut around the victim, squeezing it until it asphyxiates. The swallowing process, which almost invariably starts from the head, is greatly facilitated by the extreme expansion of the jaws, but also by the emission of a great deal of saliva and the prey's elongation due to the previous constriction. Serious injuries, occasionally produced by horns or porcupine quills piercing the oesophagus or stomach and even the skin, usually heal without any ill effects since the very active digestive juices rapidly dissolve the internal part of the prey while its protruding part eventually drops off. A disturbed or frightened animal invariably disgorges its meal. Pythons can fast for very long periods.

Especially small pythons have a lot of enemies, such as many species of mammals, raptors, and reptiles, but medium-sized and big adults are preyed upon only by a few non-human species: lions [*Panthera leo* (Linnaeus 1758)], leopards [*Panthera pardus* (Linnaeus 1758)], and crocodiles (cf. GREENE 1994). *Crocodylus niloticus* Laurenti 1768 attacks swimming pythons, killing and consuming them. STARIN & BURGHARDT (1992: 58), who studied *P. sebae* in Gambia, wrote: «On one occasion a 3 m python moved through a puddle containing a group of 6 dwarf crocodiles [*Osteolaemus tetraspis* Cope] (ranging in size from .2-1.2 m). No interaction was observed. After this study was completed, reliable sources stated that a python was attacked and killed, but not eaten, by a dwarf crocodile in a puddle in the savanna. [...] it certainly seems possible that middle to large size dwarf crocodiles could prey on neonate and young pythons». However the number one enemy of the python is surely man who acts both indirectly [habitat destruction or alteration; use of fishing nets and fishing traps (for the latter see CANSDALE 1955, GRUSCHWITZ et al. 1991)] and directly, killing them for their valuable skin or because they threaten poultry and livestock in general, or collecting them for zoos, scientists and an ever-increasing number of amateurs. Some peoples eat them extensively or use parts of their body for medical purposes; BUTLER & SHITU (1985) reported that in Nigeria their meat is used as food, whereas the fat of the abdominal cavity is used as food and also as a rubbing ointment said to soothe muscle aches and sprains, arthritis, and rheumatism. SIMONETTA & MAGNONI (1986), dealing with the status and conservation problems of lower vertebrates in Somalia, pointed out that in this country *Python sebae* has been decimated by the combined effect of hunting for an underground skin market and destruction of wet habitats, particularly of riverine forests, which have almost completely disappeared. SCHMIDT (1923: 55) reported that pythons in the Democratic Republic of Congo «[...] are often caught by means of traps set at their holes» and that «During the rainy season the natives follow their tracks, and if

they find the retreat a noose is at once set in front of the hole. The snake is usually caught behind the neck. The natives also spear them (H. Lang)».

Unlike other species, e.g. *P. regius* and *P. molurus*, Seba's pythons are bad-tempered, very aggressive animals, and only a few specimens tame down in captivity. In the wild they usually try to escape if confronted, but if cornered they strike viciously and can inflict severe traumas, such as bruises, deep cuts and wounds, with their snout and powerful dentition. SPAWLS et al. (2002: 310) reported that «A herpetologist in South Africa required 57 stitches after a python bite and a well known Kenyan vet lost his left eye after a python struck him in the face». Specimens about 4 m in length are already capable of constricting a well-built man; however *P. sebae* and *P. natalensis* rarely — if ever — eat humans; reported of a fatal attack by a python and cases where humans were the prey have been critically summarised by BRANCH & HAACKE (1980) and HAACKE (1981). SPAWLS et al. (2002: 310) refer what follows: «ARTHUR LOVERIDGE (1933) records a possible fatal attack on a woman on Ukerewe Island in Lake Victoria (*P. sebae*); the victim, who was in ill health, had disappeared and was found dead in the coils of a 4.5 m python, which might have killed her. In general, humans are too big a prey for pythons, although unattended small children in python country are at risk. A 4.8 m python swallowed a 59 kg impala; many humans weigh less than that». STARIN & BURGHARDT (1992) observed in Gambia that pythons often allowed humans or animals to approach closely, either freezing, remaining motionless, continuing ongoing behaviour, or just moving away slowly; moreover loud noises, vigorous movements, and other attempts to encourage the snake to depart often had little effect. GREENE (1994) listed the following antipredator mechanisms in pythons: crypsis, hiss, S-coil (the head and neck are retracted in a striking posture), strike, bite, disgorge meal (this might be simply a side effect of fear), and tail display. *P. sebae* employs two types of defensive caudal displays, coiling the tail into a flat disk (STEMMLER 1971, STARIN & BURGHARDT 1992) or, according to observations on a captive Liberian specimen, vibrating it violently in front of its snout in the manner of a rattlesnake (SENER 2000). Finally, unprovoked pythons are not dangerous to man and deserve to be strictly protected, as, by eating many rodents, they are strongly beneficial to agriculture.

Pythons are often associated with superstition by members of many indigenous native peoples and, consequently, are not interfered with or killed in many parts of Africa (FITZSIMONS 1962). In some areas they are venerated; a common belief is that if they are killed, rain will not fall (SPAWLS et al. 2002). A very long series of Cameroonian beliefs and tales concerning *P. sebae* has been listed by STUCKI-STIRN (1979: 129-131). In the Sudan it is a belief that the claw-like vestigial hind-limbs are thrust into the nostrils of the prey to suffocate it (CORKILL 1935: 12).

Data on the reproductive biology, difficult to obtain in the field, are relatively scarce as Seba's pythons «are not common in captivity, perhaps because of their large size, bad tempers, and general resemblance to the much calmer *P. molurus*» (WALLS 1998a: 169). On the other hand, in addition to the possibility that some of the available data could refer to *P. natalensis*, it is necessary to take into account that all phases of python reproduction and growth are largely dependent on environmental (especially temperature and relative humidity) and individual (e.g. age, size and diet) conditions, which at least partly explain some discordant information in the literature.

STARIN & BURGHARDT (1992), studying the social behaviour of *P. sebae* in Gambia, observed (only in winter) an apparently unreported type of behaviour in groups of two or more snakes (up to six) that were largely oblivious to the observer.

On March 1, at 14:15 in the sun in a clearing, two pythons (about 3 and 3.5 m long) were found coiled around each other; the following day, at 12:30 and in the same conditions, six pythons (2.1 to 6 m long) were observed while actively sliding over and around each other, and afterwards moving away one after another within about 20 min. On March 3, in the same conditions, two to four animals were observed tightly wrapped around each other at least between 07:30 and 12:15 hr (none present at 15:30). On January 23, at 11:00, in the woodland savanna, two 3.5 m pythons were observed entwined in an S shape; when approached to within a meter, one of them moved off but the other remained stretched out for at least 10 min. STARIN & BURGHARDT supposed that these incidents during the dry season could best be interpreted as courtship, but at the same time they pointed out that it was impossible to sex any specimen during their study, as the presence of spurs in males is hard to detect in uncaught animals in the field. This allows one to speculate that the animals seen by STARIN & BURGHARDT were actually males engaged in pre-mating ritualized struggles. But this hypothesis can be excluded, as the fighting behaviour of *P. sebae* appears to be completely different; BARKER & BARKER (1994: 20) described it as follows: «No biting was observed, but there was head raising, topping and throwing, body wrapping and constricting, tail wrapping and spurring, lots of pushing and shoving, all the components of a good wrestling match». Copulation, by a ♀ 3.75 m long and a meter shorter ♂, owned respectively for 6 and 12 years, was seemingly first described by MUNNIG SCHMIDT (1971), who observed it between March 18 and 24, in a terrarium with temperature of 25-27 °C. Further research has confirmed the observations by MUNNIG SCHMIDT (1971) on captive animals and those by STUCKI-STIRN (1979: 50) and STARIN & BURGHARDT (1992) in the field: the breeding season takes place in winter (see also SCHMIDT 1989: in February-March and November; WALLS 1998a: in February), so that mating can be induced in bred animals by reproducing winter conditions, i.e. by reducing the day-time photoperiod to 8-10 hr and dropping the day-time and night-time temperatures respectively to 27-30 and 24-27 °C, but never under 20 °C (BARKER & BARKER 1994, FAIN 2001, VIANELLO 2002, MCCURLEY & GLASGOW 2003). However, exceptions occur, since, *P. sebae* is reported to mate and lay eggs throughout the year around Lake Victoria (SPAWLS et al. 2002). In any case, such discordances could be related, at least partly, to the fact that the female can also reproduce long after the last copulation, being able to store fertile spermatozoa in her body for longer than 4 years (VISSER 1985). In captivity gestation lasts 30-40 days (FAIN 2001), about 44-50 days (MCCURLEY & GLASGOW 2003), 51-54 days (BARKER & BARKER 1994), about 70 days (MUNNIG SCHMIDT 1971), or even 4 months (VIANELLO 2002); its duration depends on many factors, especially temperature and humidity (VIANELLO 2002). The same applies to incubation, lasting 60-80 days at a temperature of 28-32 °C (SLAVENS 1984, BARKER & BARKER 1994, FAIN 2001, VIANELLO 2002, MCCURLEY & GLASGOW 2003); according to STAFFORD (1986) the optimum temperature range for incubation is 28-32 °C at a relative humidity of 90-100%, and under these conditions the eggs can be expected to hatch some 50 to 75 days after they are laid. POPE (1961) reported that at 25-34 °C a clutch required almost 100 days of incubation. DOUCET (1963) mentioned an incubation period of 8 weeks. SCHMIDT (1989) gave different and seemingly questionable figures: 75-109 days at temperatures of 30-32 °C. In the wild, in Cameroon, mating occurred in December and the eggs were found in February and March (STUCKI-STIRN 1979: 50). WALLS (1998a) reported that incubation lasts 52-79 days in captivity and about 2 months in nature. Places selected by the female to oviposit, usually moist ones, include secluded cavities beneath objects on the ground, deep crevices and other natural underground

cavities, abandoned burrows (especially of warthogs, aardvarks, and porcupines) or hollows in termite mounds, but in the absence of such sites she may lay her eggs on the surface of the ground in tangled undergrowth, dense grass or pockets of dead leaves (POPE, 1961, STAFFORD 1986, PACKARD & PACKARD 1994, WALLS 1998a). The eggs are deposited in a single mass up to 30 cm in height and covering an area of about 40-60 cm in diameter; their number, usually related to the female's size, ranges between 16 and 100, but more than 80 can be regarded as a very high number of eggs from one female (BENEDICT 1932, DOUCET 1963, MUNNIG SCHMIDT 1973a, STAFFORD 1986, WALLS 1998a, CHIPPAUX 2001, VIANELLO 2002). The following figures refer to 8 Cameroonian specimens, e.g., have been found: a ♀ 305 cm long laid 27 eggs; 312 cm, 32 eggs; 420 cm, 43 eggs; 456 cm, 54 eggs; 543 cm, 34 eggs; 568 cm, 42 eggs; 617 cm, 65 eggs; 678 cm, 73 eggs (STUCKI-STIRN 1979: 50). Immediately after oviposition the female coils round her clutch and remains so, except for almost daily visits to the nearest water, until a few hours before the eggs are due to hatch; at least in captivity, she may leave the eggs for a few hours, more and more frequently as hatching gets nearer, to bask in the sun or near a heater (MUNNIG SCHMIDT 1973a). This type of parental care, practically occurring only in pythons, serves both to protect the eggs from predators (mongooses, rats, some reptiles, birds of prey, etc.) and to aid in incubation of the eggs. In support of the latter purpose, it has been observed in some species of pythons that the temperature of the brooding female rises by as much as 6.5 °C above the ambient air temperature, to reach as high as 36 °C. This is due to metabolic heat production resulting, at least in some species (e.g. in *Python molurus*), from intermittent, spasmodic contractions of the body musculature (shivering thermogenesis); the shivering frequency is inversely related to the ambient temperature and directly related to oxygen consumption (BARTHOLOMEW 1982), which increases as much as tenfold above resting levels (BENNETT 1982). In short, whereas males and nonbrooding females act like other ectotherms, the females brooding eggs or preparing to oviposit behave like endotherms, since their metabolic response to temperature is qualitatively similar to that of birds and mammals (BARTHOLOMEW 1982; see also SCHIERECK 1989 concerning thermoregulation in snakes); moreover BARTHOLOMEW (1982: 201) considers that «Although only fragmentary and anecdotal data are available for boids other than *P. molurus* (VINEGAR et al. 1970), it would be surprising if endothermic incubation did not occur in other species of large size [...]». However, this does not seem to be the case for *P. sebae* (e.g., cf. VINEGAR et al. 1970, PITMAN 1974, SCHMIDT 1989, BARKER & BARKER 1994, and WALLS 1998a), despite the statement to the contrary by SHINE (1994: 289, table III); in fact, according to our audit, in SHINE's statement appears to be based on a wrong interpretation of BENEDICT (1932) and NOBLE (1935). Other authors found that the body of the brooding female was warmer than the ambient temperature (e.g., MUNNIG SCHMIDT 1973a: seemingly about 3 °C warmer at an ambient temperature of 25-27 °C) but did not give any indication of muscular contractions. SPAWLS et al. (2002: 310) stated that «the rock python is not known to shiver but a Cameroonian Central African Rock Python [i.e. a "true" *P. sebae*] was found to have elevated its temperature by 6.5 °C while brooding»; if this statement refers to STUCKI-STIRN (1979: 154) it does not concern a «Cameroonian» specimens as Stucki-Stirn's text is nothing but the almost word-for-word quotation of clearly very general statements by FITZSIMONS (1962: 67, right column)! Usually, if not always, each clutch contains a variable number of sterile eggs, up to 50% according to FITZSIMONS (1962). However, even fertile eggs, may fail to develop due to different types of stress; BRANCH & PATTERSON (1975) found, in captive *P. natalensis* from Transvaal, that a particularly

lengthy incubation may result in abnormal, stunted hatchlings, which appear “premature” and have pale pigmentation as well as weak motor control; abnormalities may also appear if the eggs are incubated at low temperature. After hatching, maternal instincts end. JOSHI (1967: 310-311), who studied Nigerian animals, wrote: «In the African python, before egg laying there is a considerable embryonic development. In one particular specimen an incision was made in its body, six eggs were extracted and compared with those subsequently laid by the same snake. [...] The average weight [...] and length [...] of 10 hatchlings that eventually emerged from the eggs were 54 g and 62 cm respectively. The fact that these embryos were only slightly heavier than those removed from the unlaidd eggs is attributed to the greater fluid content of the latter. Likewise, the larger weights of the shell, yoke, and albumen of the unlaidd eggs are due to the same reason. The 28 eggs laid were divided into four equal batches. Batch 1 was placed in a scooped-out depression, in moist earth contained in a basket, which was then kept in a hole in the ground in a dark moist place. Temperature ranged from 72 to 84 °F, and relative humidities (RH) from 65 to 80%. Five of the seven eggs hatched within 52 days. Batch 2 was placed in a basket filled with straw, in a dry sunny place. Temperature ranged from 70 to 90 °F. Owing to the low humidity (less than 40% RH), none of the eggs hatched. Batch 3 was surrounded by moist soil in a dry sunny place. No eggs hatched. Batch 4 was maintained similarly as Batch 1, but at temperature of 86 to 90 °F, and from 80 to 90% RH. Four eggs hatched within 49 days. The results show that in the tropics, particularly West Africa, laidd eggs of *Python sebae* need not be incubated by the female. A moist atmosphere and high temperature are sufficient to allow further development of the already well-advanced embryo, which hatches in about two months. Hatching time varies with the surrounding temperature and high humidity is essential for development». At the time of hatching, the young pythons slit the egg shell by means of their egg-tooth, a formation situated on the end of the snout and destined to be quickly lost; they often remain hidden for a short time inside the egg after rupturing the shell (STAFFORD 1986), but when actually hatched they prove to be completely autonomous, actively hunting on the ground as well as on trees. Nonetheless, the observations by STANFORD (1994) based on specimens of *P. natalensis* (cited as *P. sebae*) from the eastern shore of Lake Tanganyika (Tanzania) showed that hatchlings have a strong degree of nest site fidelity, abandoning the nest after only about 10 days, probably after their first shedding.

As the increase in size varies with the quantity and quality of food and the general conditions, the reported growth rate varies widely among authors. Some data are cited hereunder; all of them refer to captive animals, since as far as we know, no field data exist. A ♀ brought to the National Zoological Park of Washington when about 3.5 m long grew nearly a meter in about three years (BENEDICT 1932: 95). STARIN & BURGHARDT (1992: 59) reported that «POPE (1961) cites records of a female growing to about 2.7 m and breeding in her sixth year and a male that grew from 75 cm to 3.6 m in six years. Another snake grew from 53 to 86 cm in 4.5 months. WHITWORTH (1974) records the highest growth rate of an African python (sex unrecorded): from October 1966 to February 1968 (16 months) it grew from .53 to 2.13 m and was 4.65 m by December 1970 (50 months)». RAYNIS (1965) gave the following values for an immature, unsexed captive specimen (with a proper diet not supplemented with vitamins or growth stimulants): 17.IX.1963 (about 2 months old) = 69 cm, 170 g; 17.IX.1964 = 200 cm, 3968 g. This snake shed its skin on the following dates (intervals between sheddings in parentheses): 21.X.1963, 23.XI (33 days), 26.XII (34), 10.II (46), 3.IV (52), 7.VII (95), and 21.IX.1964 (76), the intervals averaging 56 days.

MUNNIG SCHMIDT (1973b) gave the following approximate values for two captive specimens: (1) a male VI.1972 (newborn specimen) = 60 cm and 100 g, 3.VI.1973 = 175 cm and 3000 g; (2) a female VI.1972 (newborn specimen) = 60 cm and 100 g, 3.VI.1973 = 180 cm and 3200 g.

STUCKI-STIRN (1979: 42), in Cameroonian animals, observed a slower growth in 40 juveniles, whose length at one year from birth ranged between 92 and 109 cm, averaging 97 cm; some of them were kept for the following years and showed lengths of 180, 250 and 320 cm at 2, 3 and 4 years respectively. He gave the following monthly growth values for a captive, well fed specimen: 14.IV.1960 (birth) = 52 cm; 14.V.1960 = 57 cm; 15.VI.1960 = 63 cm; 15.VII.1960 = 70 cm; 15.VIII.1960 = 71; 15.IX.1960 = 78 cm; 15.X.1960 = 85 cm; 15.XI.1960 = 92 cm; 15.XII.1960; 15.I.1961 = 94 cm; 15.II.1961 = 98 cm; 15.III.1961 = 103 cm; 15.IV.1961 = 107 cm. The specimen sloughed on the following dates: 29.IV.1960, 10.VI.1960, 7.VIII.1960, 12.X.1960, 14.XII.1960, 10.II.1961, 7.IV.1961.

STUCKI-STIRN (1979: 50) also gave details about growth from other records (from lengths of 53 and 76 cm to 86 cm in 5 months and 362 cm in 6 years, respectively) and growth after maturity (a specimen 345 cm long grew 102 cm over a period of 4 years). SCHMIDT (1989): hatchlings, 60-70 cm long, grew rapidly to 2.5 m in 5 years. WALLS (1998a: 170): «The young are about 550 mm long. They grow rapidly for their first two or three years, as much as 10 kilos per year». SPAWLS et al. (2002: 310): «Growth rates can be rapid; a clutch of 9 juveniles kept in Nairobi under semi-natural conditions were all between 50 and 55 cm at birth, a year later the largest was 1.37 m, and the smallest 90 cm».

STUCKI-STIRN (1979: 50), in Cameroon, found that maturity is reached after about 5 or 6 years, when the animals are about 300-400 cm long. WALLS (1998a) wrote that the species seems to reach maturity at an age of 3 years. FAIN (2001): maturity is reached in 2-4 years; males and females can reach maturity when 2.2 m and 2.7 m long respectively. VIANELLO (2002) maintained that maturity is reached when males and females are respectively 2 and 3 years old. According to McCURLEY & GLASGOW (2003), African rock pythons reach sexual maturity anywhere from 18 months ($\sigma\sigma$) to 4 years (♀♀) of age, and $\sigma\sigma$ and ♀♀ may breed at about 1.8 m and 2.7 m in length respectively.

SPAWLS et al. (2002) reported that captive specimens have lived for over 27 years.

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APPENDIX 1

Measurements and counts of the specimens studied.

Abbreviations: CO = number of circumorbital scales; EHD = horizontal eye diameter; GL = number of gulars between mental and first pseudoventral; H = subcaudal reached by the retracted hemipenis; HL = head length; IO = lowest number of interorbital scales (including the upper oculars); IPPF = number of interprefrontals (i.e. number of scales between posterior prefrontals); LL = lower labials; MSR = numbers of longitudinal rows of scales at midbody; NO = lowest number of scales between posterior prefrontals and eye; NS = number of longitudinal rows of scales behind the occiput; OS = lowest number of scales between eye and upper labials; PC = number of longitudinal rows of scales a head length anterior to the cloaca; SC = number of subcaudals; SnL = snout length (i.e. distance between snout tip and eye); TaL = tail length; TL = total length; UL = upper labials, supralabials; V = number of ventrals according to the "wider than long system", i.e. of pseudoventrals + true ventrals; VD = number of ventrals according to the "Dowling system", i.e. of the true ventrals.

Eryx colubrinus (Linnaeus 1758)

Number	Sex	TL	TaL	HL	SnL	EHD	IO	CO	OS	UL	NO	GL	NS	MSR	PC	V	VD	SC	H
MSNM 631	♂	445	42	—	—	—	11	13/14	2/2	13/13	5/5	15	—	55	—	175	173	26	10
MSNM 636	♂	610	62	—	—	—	11	-/13	-/2	-/13	5/5	16	—	54	—	177	175	26	9
MSNM 638	♂	~ 400	36	—	—	—	10	12/14	2/2	14/14	6/6	18	—	55	—	—	—	24	10
MSNM 639	♂	247	22	—	—	—	11	13/13	2/2	13/14	5/5	15	—	55	—	181	176	27	11
MSNM 643	♂	360	35	—	—	2.20	11	13/13	2/2	13/13	6/6	14	45	51	29	174	173	25	11
MSNM 645	♂	232	20	—	5.5	1.80	10	12/13	2/1	13/12	5/5	16	48	50	28	177	170	22	11
MZUF 979	♂	395	37	—	—	—	11	14/14	3/3	13/14	6/6	20	—	53	—	190	188	24	10
MZUF 1084	♂	220	21	9.3	4.9	2.00	11	13/13	2/2	14/14	5/6	16	—	53	—	169	168	28	—
MZUF 1085	♂	323	33	—	—	—	10	14/15	2/2	13/14	5/4	14	—	51	—	170	167	23	—
MZUF 1086	♂	410	37	13.7	7.4	2.30	10	13/11	2/2	13/14	5/6	15	—	52	—	181	177	28	12
MZUF 1087	♂	267	25	—	—	—	11	11/12	2/2	14/14	5/5	15	—	50	—	179	175	25	13
MZUF 1090	♂	216	21	—	—	—	11	13/12	2/3	14/14	5/5	20	—	52	—	173	170	27	12
MZUF 1735	♂	358	39	—	7.0	2.60	12	14/13	2/2	14/14	5/5	16	—	48	—	175	174	26	—
MZUF 2021	♂	520	52	15.4	8.4	2.90	—	12/13	3/3	13/13	5/5	15	—	53	—	176	173	27	11
MZUF 2190	♂	555	55	17.7	9.2	2.95	9	13/15	3/3	14/13	5/5	18	—	52	—	174	171	26	14
MZUF 2245	♂	~ 367	43	—	—	—	10	13/12	2/2	11/11	4/5	15	—	50	—	181	179	26	10
MZUF 2804	♂	196	17	8.5	—	1.8	10	13/13	2/2	14/14	5/6	15	—	52	—	173	170	26	10

(continued)

Eryx somalicus Scortecchi 1939

Number	Sex	TL	TaL	HL	SnL	EHD	IO	CO	OS	UL	NO	GL	NS	MSR	PC	V	VD	SC	H
MZUF 5250	♂?	145	12	—	—	—	5	9/10	1/1	—	3/3	12	34	37	27	156	—	21	
BMNH 1949.2.1.46	♀	264	23	13.20	—	1.80	5	9/9	1/1	10/9	—	—	—	34	—	159	—	23	
MSNM 581	♀	295	26	9.80	5.6	1.80	6	11/11	1/1	10/10	3/3	12	38	40	27	161	158	24	
MZUF 2588	♀	240	25	9.65	5.1	2.00	5	10/9	1/1	10/10	3/3	12	33	37	25	—	—	22	
MZUF 5251	♀	161	13	7.20	3.55	1.56	4	9/11	1/1	8/10	3/3	11	35	37	26	158	155	21	
MZUF 6714	♀	254	24	9.90	5.0	2.00	6	10/10	1/1	—/10	3/3	—	—	36	25	163	—	21	
MZUF 27653	♀	133	11	6.20	3.3	1.40	6	10/10	1/1	10/10	2/2	11	34	35	27	157	155	22	
MZUF 33636	♀	390	33	—	—	2.20	6	10/9	1/1	10/10	3/3	—	36	39	27	159	157	22	
MCZ 72038	?	~177	19	—	—	—	5	11/11	—	—	—	—	36	38	23	159	—	25	
MSNG —	?	225	26	—	—	—	6	10/10	1/1	10/10	—	—	—	39	—	156	—	25	

Eryx borrii n. sp.

Number	Sex	TL	TaL	HL	SnL	EHD	IO	CO	OS	UL	NO	GL	NS	MSR	PC	V	VD	SC	H
BMNH 1900.11.28.4	♀	303	25	13.3	4.8	2.00	5	10/10	1/1	10/11	3/3	12	—	39	—	193	189	26	

Python sebae (Gmelin 1789)

Number	Sex	TL	TaL	HL	SnL	EHD	CO	IPPF	UL	LL	NS	MSR	PC	V	VD	SC	H
MSNM 802	♂	903	113	60.9	—	—	5/5	—	13/14	19/23	67	88	45	277	277	73	—
MZUF 2214	♂	824	104	29.1	14.0	5.1	7/8	2	14/14	19/20	66	82	45	272	272	72	12
MZUF 2216	♂	855	110	29.0	14.1	5.1	9/9	2	14/16	23/22	66	86	46	273	273	67	12
MZUF 27044	♂	755	95	26.7	13.5	5.0	9/9	2	14/14	22/23	71	92	46	279	279	74	—
MZUF 2202	♀	790	100	29.5	13.6	4.9	7/7	2	14/13	20/21	63	86	44	276	276	69	—
MZUF 2215	♀	773	93	—	—	—	9/9	—	15/14	—	—	89	—	274	274	68	—
MZUF 2217	♀	885	105	—	—	—	8/9	—	13/14	—	—	84	—	277	277	66	—
MZUF 3972	♀	1055*	110*	—	—	—	7/6	3	14/12	22/21	68	87	44	280	280	65	—
MZUF 5154	♀	3540*	430*	~100	—	~9.7	9/8	2	14/14	21/20	—	88	—	—	—	—	—
MZUF 5653	♀	~517	80	27.6	13.6	4.8	7/7	1	14/14	21/23	65	86	44	270	270	67	—
MZUF 18483	♀	800*	110*	—	—	—	9/—	1	13/13	23/—	70	87	45	273	273	—	—
MZUF 27045	♀	710	90	26.8	13.8	4.8	8/8	3	16/16	23/23	70	89	44	276	276	68	—
MZUF 21651	?	—	—	60.9	29.4	7.4	6/6	1	14/14	21/21	—	—	—	—	—	—	—
MZUF 21663	?	—	—	95.6	46.1	8.9	8/—	2	14/14	22/22	—	—	—	—	—	—	—

* Measurements on freshly killed specimens.