Notes on *Xenochrophis schnurrenbergeri* Kramer, 1977 (Serpentes: Colubridae) from Assam, India with some comments on its morphology and distribution

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**Abstract.** This paper provides information on the morphological characteristics of *X. schnurrenbergeri* along with the first locality record from Northeast India. A distributional summary of the species in Southern Asia is provided. A comparative study between *X. schnurrenbergeri* with its sympatric species *X. piscator* is also elaborated here. The most striking differences noticed in the comparison were those regarding the structure of the hemipenes, relative tail length, number of ventrals, numbers of subcaudals and nape markings.

**Keywords.** *Xenochrophis schnurrenbergeri*, *Xenochrophis piscator*, Distribution, Assam, India, Deeporbeel.

**Introduction**

The genus *Xenochrophis* was established by Günther (1864) with the type species *Psammophis cerasogaster* (Cantor, 1839). Etymologically, *Xenochrophis* (Gr. Xenos: strange; chroma: colour; ophis: snake) implies a strange-coloured snake. The genus *Xenochrophis* is represented by twelve species worldwide (Uetz, 2009). Furthermore, Vogel and David (2006), considered *X. piscator* (Schneider, 1799), to be a species complex having seven distinct member species. Smith (1943) also mentioned four subspecies of the former *Natrix piscator* from British India. The genus *Xenochrophis* is represented by seven species (Das, 2003) in India. From Assam, Ahmed, Das and Dutta (2009) reported five species of snakes of the genus *Xenochrophis*: *X. piscator*, *X. flavipunctatus* (Hallowell, 1860). *X. cerasogaster*, *X. sanctijohannis* (Boulenger, 1890) and *X. schnurrenbergeri* (Kramer, 1977). However, Vogel and David (2006) cast doubt on the presence of *X. flavipunctatus* in India. *X. schnurrenbergeri* is the most recent addition to the genus *Xenochrophis* and was described by Kramer (1977) as *Xenochrophis flavipunctatus schnurrenbergeri* from Devanandpur, Bhairawa (27°30′N, 83°28′E; 150 m asl) in Nepal (holotype: MHNG 1377.44). Subsequently, Vogel and David (2006) elevated it to species level and gave further records for the species in Nishangarh, Uttar Pradesh (ZMH R04814) and Varanasi, Uttar Pradesh (ZMH R04811) in India (Vogel, pers. comm. 2009). Despite the fact that Ahmed et al (2009) mentioned *Xenochrophis schnurrenbergeri* from northeastern India, they failed to give any locality records.

For our study we have selected one of the largest wetlands of Northeastern India and the lone RAMSAR site (Ramsar, 1971) in the state of Assam, The Deeporbeel (coordinates: 26.132323° N; 91.654644° E). The wetland is a proposed bird sanctuary. It is situated at about 18 km from the capital city of Assam, Guwahati on the north bank of river Brahmaputra and is an important flood plain lake of Assam. In this paper we provide the first locality record of *X. schnurrenbergeri* from Assam, Northeastern India and make a detailed comparative study with its closely related congener, *X. piscator*.

**Material and Methods**

Active land-based searches along with boat cruise-based searches were conducted. Opportunistic collections from fishing nets were also made. The collections in the Zoological Survey of India, Kolkata and Zoological Survey of India, Shillong were studied. Collected specimens were preserved in 10% formaldehyde. Measurements were taken (in mm) using Mitutoyo dial calipers with 0.05 mm precision. Ventral scales were counted as per Dow-
ling (1951) and the subcaudals were counted excluding the terminal scute. Radiological examination of the snakes was done by using Bharat Electronics AERB/04/076 with factors KV-45-55, mAs-4, mA-100. For precaudal and subcaudal vertebral counts, demarcation was made by inserting a pin in the muscle just below the anal scale. Detailed structure of the hemipenis was studied after eversion by injecting 10% formaldehyde. Abbreviations used here are V (number of ventrals); Sc (number of subcaudals); SVL (snout to vent length); TL (tail length); ToL (total length); SL (number of supralabials); IL (number of infralabials); SL(E) (supralabials touching the eye); Temp (number of temporals); PO (number of postoculars); ED (eye diameter); HL (head length at angle of jaw); DSR (dorsal scale rows); PCV (pre caudal vertebrae); CV (caudal vertebrae); RH (rostral height); RW (rostral width); HPL (hemipenis length); HPW (hemipenis width in mm); RoB (region of bifurcation of the sulcus spermaticus); M (male); F (female); ZSIC (Zoological Survey of India, Kolkata); ZSIS (Zoological Survey of India, Shillong); AVCM (Arya Vidyapeeth College Museum); WB (State of West Bengal, India); JP: Jayaditya Purkayastha’s personal collection.

Results and Discussion

Morphology

Of the 10 specimens of *Xenochrophis schnurrenbergeri* we studied, the snake was found to be of moderate size [SVL (max) 655 mm], with a stout and cylindrical body; head slightly distinct from the neck; dorsal scales feebly keeled anteriorly which gradually gets stronger posteriorly. Generally, the first three rows of dorsolateral scales are smooth. The dorsal scales are in 19:19:17 rows. Eyes moderate (ED/HL=0.1836), rostral wider than high (RH/RW=0.5939), pupil round, nostrils lateral. Supralabials 9-10, generally 4th, 5th touching the eye, infralabials 8–10. Two pairs of chin shields, the posterior one bigger, a mental groove present. Temporals 2+2/2+3 (rarely 1+2), 1 large preocular, 2-3 postoculurs; a subocular was noticed only in one
specimen (JP00073). Ventrals 136–147, subcaudals 64–79 (see Table 1).

Head olive brown with two well-defined subocular streaks, the anterior passing through the 5<sup>th</sup> and 6<sup>th</sup> or 6<sup>th</sup> and 7<sup>th</sup> supralabials; the posterior one passes between 8<sup>th</sup> and 9<sup>th</sup> supralabial extending from the eye to the corner of the mouth but not meeting the nuchal crossbar. Dorsum brownish olive with six rows of black box like pattern arranged on it, which fades posteriorly and gets obliterated. A straight dark crossbar present on the nape region. The venter is whitish with black margin between two ventral scales, restricted only to the lateral edges. The precaudal vertebrae count 136-148, subcaudal vertebrae count 68-86, hypapophyses present on the

![Figure 2. Live X. schnurrenbergeri (JP0099) from Guwahati, Assam, India.](image)

Table 1. Meristic and mensural characters of *Xenochrophis schnurrenbergeri* from India (right side of the specimen was considered for all scale counts).

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posterior dorsal vertebrae. Hemipenis spinous and bilobed; it bifurcates for about 1/3rd of its length, sulcus spermaticus bifurcates, enters into apical lobes and extends almost up to its tip; spines distributed somewhat homogenously across its length. The adpressed hemipenis touches the 10th subcaudal; ornamentation present in the form of four prominent hooks just below the point where the hemipenis bifurcates.

Natural History

*Xenochrophis schnurrenbergeri* was mostly found amongst aquatic vegetation of Deeporbeel with the dominant plants being water hyacinth (*Eicchornia crassipes*), fox nut (*Euryale ferox*), esthwaite waterweed (*Hydrilla verticillata*), azolla (*Azolla pinnata*) water cashewnut (*Trapa bispinosa*). The herpetological community of Deeporbeel wetland encountered during this study comprises of *X. piscator*, *X. cerasogaster*, *Enhydris enhydris* (Schneider, 1799), *Naja kouthia* (Lesson, 1831), *Duttaphrynus melanostictus* (Schneider, 1799), *Euphlyctis cyanophlyctis* (Schneider, 1799), *Hoplobatrachus tigerinus* (Daudin,1859), *Humerana humeralis* (Boulenger 1887), *Hylarana* (Tschudi, 1838) sp., *Fejervarya* (Bolkay, 1915) sp. We have noticed that *X. schnurrenbergeri* is much more aquatic in its habit than *X. piscator* and all our collections of the former species were from within or near water hyacinth. Further, the live *X. schnurrenbergeri* we encountered seemed to be rather timid.

Comparison

*Xenochrophis schnurrenbergeri* was found living in sympatry with congeneric *X. piscator* and *X. cerasogaster* in the study area. *X. schnurrenbergeri* closely resembles *X. piscator* but differs from the latter in several aspects. *X. schnurrenbergeri* has a dorsum brownish olive in colour with prominent dark rectangular box pattern perpendicular to the longitudinal body axis (vs. cream to light brown dorsum with black blotches or sometimes rectangular box pattern generally parallel to the longitudinal body axis which in some cases get diffused in *X. piscator*); a continuous, straight black mark on the nape (vs. absent or an inverted “V” shape in *X. piscator*, see Fig 5); head not clearly demarcated from the neck (vs. distinct neck in *X. piscator*); low relative tail length (TL/ToL: 0.2384 vs. 0.2869 in *X. piscator*) and lower number of subcaudals (64–79 vs. 76-96 in *X piscator*). The number of vertebrae in *X. schnurrenbergeri* is lower than *X. piscator* (*X. schnurrenbergeri*: 216- 220, avg: 217.2; *X. piscator*: 221- 238 avg: 229.85). The structure of the hemipenis exhibits the most striking difference between these two congeneric species (Table 2, Fig. 4).

In *X. schnurrenbergeri* the hemipenis is elongated (vs. broad and stout in *X. piscator*); extended up to 10 (vs. 7 in *X. piscator*) subcaudals; In *X. schnurrenbergeri* the hemipenis has an elongated apex (vs. *X. piscator* has two disc shaped structure on each hemipenis the apex of which is rather flat); the sulcus spermaticus bifurcates much below the apex and each lobe is a distinct elongated projection (vs. bifurcation is very close to apex and the lobes are represented by two swollen much shorter globular projections in *X. piscator*), entering the disc at the apex instantly (vs. coils to enter the disc at the apex taking a spiral turn in *X. piscator*); spines in hemipenis are evenly distributed throughout (vs. mostly confined to the apical region more prominently in lobe region, and nearly absent in the proximal region in *X. piscator*); prominent hooks below the point of bifurcation (vs. indistinct in *X. piscator*).

Distribution

From the records of earlier publications (Smith 1943, Kramer 1977, Vogel 2006), the present study,
collections in museums, online museum databases and from personal communications from Gernot Vogel, *X. schnurrenbergeri* appears to be present in north and north east India, Nepal and Pakistan (see Fig 1, Materials examined). In India, we recorded the presence of this species in four states: Uttar Pradesh, Bihar, West Bengal and Assam. Since *X. Schnurrenbergeri* is currently not designated by any common name, from conservational point of view we propose the common name bar-necked keelback.

A key to the snakes of the genus Xenochrophis in the study area

1. 4th supralabial touching eyes: *X. cerasogaster*
4th and 5th supralabial touching the eyes: 2
2a. Nuchal marking in shape of inverted V or absent and hemipenis having disked apex: *X. piscator*
2b. Nuchal marking in shape of straight crossbar and hemipenis without disc at apex: *X. schnurrenbergeri.*

Materials Examined

*Xenochrophis piscator:*

**ZSIC**: 25769 (Baripada, Orissa), 22462, 21650 (Benaras, Uttar Pradesh), 22573 (Balasore, Orissa), 24646 (East Kameng, Arunachal Pradesh), 25595 (Kolkata, West Bengal), 24406 (24 Parganas West Bengal), 24407 (Midnapore, West Bengal), 22189 (Goa), 23938 (Kolkata, West Bengal).

**ZSIS**: 35982 (Pasighat, Arunachal Pradesh), 6068 (Khasi Hills, Meghalaya), 20390 (Kokrajhar, Assam), 503 (Khasi Hills, Meghalaya), 8353 (East Khasi Hills, Meghalaya), 8928 (North Tripura), V/ERS/ZSI 2379 (Manipur), V/ERS/ZSI 1004 (Siang, Arunachal Pradesh), V/ERS/ZSI 3082 (East Khasi Hills, Meghalaya), V/8428, VR/ERS/ZSI 339 (West Garo Hills, Meghalaya), VR/ERS/ZSI 340 (East Garo Hills, Meghalaya).


*Xenochrophis schnurrenbergeri:*

**ZSIC**: 23176 (Sunderban, West Bengal), 25734 (24 Parganas West Bengal), 23568 (Patna, Bihar).

**AVCM**: A0931 (Guwahati, Assam).


*Figure 4. Structural differences in the hemipenis of X. schnurrenbergeri (left) and X. piscator (right).*
In addition to the aforesaid, online museum database query and from personal communication with Gernot Vogel revealed the following specimen record of *X. schnurrenbergeri*.


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References


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