

**REDESCRIPTION OF *GONGYLOPHIS CONICUS* SCHNEIDER, 1801 WITH  
COMPARATIVE NOTES ON *ERYX JOHNI* RUSSELL, 1801 AND *ERYX CONICUS*  
(BOULENGER, 1893) (SERPENTES, BOIDAE)**

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**ABSTRACT**

The taxonomic revision of *Gongylophis conicus* (Schneider, 1801) which is currently considered to be a synonym of *Eryx conicus* (Boulenger, 1893) is presented here. Distinguishing characters of male and female of the species indicate that females are superior to males in respect to different characters like length and pholidosis.

The paper has a key and a brief redescription of *Eryx johnii* Russell, 1801. Comparison between two species of *Eryx* (*johnii* and *conicus*) is also mentioned here.

*Gongylophis conicus* is currently considered to be a synonym of *Eryx conicus*, but four distinguishing morphological characters (body colour, rostral shield, mental groove, and tail tip) of *Eryx conicus* and *Gongylophis conicus* reported here indicate that they are two separate genus, not synonymous to each other.

**KEYWORDS:** Reptilia, Serpentes, *Gongylophis*, *Eryx*, Systematics, West Bengal

**INTRODUCTION**

Smith (1943) recorded two species of sand boa, *Eryx conicus* and *Eryx johnii* from India, in which *E. conicus* was reported to be distributed all over India. Later, Misra et al (1984) describing the ecology, breeding biology and urinogenital system of female *E. conicus* from Bengal. Das (1991) recorded a new species of *Eryx* from south west India. Later, Tokar (1990, 1991, 1995, and 1996) described the taxonomic status of *Eryx* and *Gongylophis* in detail. Tokar (1995) also reported the distribution of *G. conicus* from West Bengal. Deraniyagala (1951) described a subspecies of *Gongylophis*, *G. conicus brevis* from Sri Lanka. The other species of *Gongylophis* reported from India is *G. whittakeri* in which the head weakly distinct from the body and has smooth scales (Das, 1991). Though the validity of the species is questionable (Tokar, 1995)

Till now, there is no conclusive report on sand boa from West Bengal, India, except a few on its distribution (Whitaker, 1978; Tokar, 1995). Beside this, most of the people have no idea about two genres of *Eryx* and *Gongylophis* (personal communication) as they are less interested about taxonomy of this genus and always designate rough scaled sand boa as *E. conicus*.

Hence, in order to consummate a full vision on rough scaled sand boa as found in West Bengal, India, a study on revision of *Gongylophis conicus* with distinguishing characters from *Eryx conicus* is reported here. Moreover, a revision of *E. johnii* is added with a comparison to *E. conicus*.

## MATERIALS AND METHODS

The study is based on a total of six specimens of *Gongylophis conicus* (four females and two males), and six specimens of the genus *Eryx* (three each from *E. conicus* and *E. johnii*).

Information on seasonal and diurnal activity and food habit of all three species is collected from local people (especially agriculture, farmers, snake charmers and Mr. Dinabandhu Biswas) who observed the snakes in their natural habitat.

Standard statistical methods (S. D. and t-test) were applied.

### Measurable characters and indices

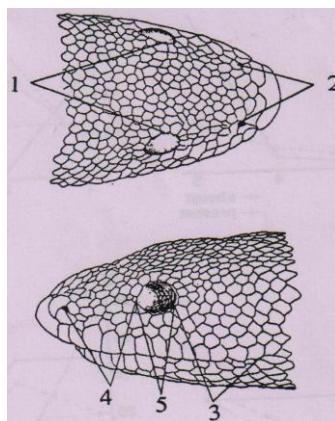
**SVL:** body length was measured from the edge of the rostral to the posterior edge of the anal shield.

**LCD:** tail length was measured from the posterior edge of the anal shield to the tip of the tail.

Indices a scheme of measurements is given in Figure 1.

**YIN:** interocular distance related to the distance between the posterior external angles of internasals

**YYM:** interocular distance related to the distance from the posterior eye border to the lower posterior angle of the last upper labial.



**Figure 1 Measurement Scheme for the Head of *G. conicus* 1. Interocular Distance. 2. Distance between Posterior External Angles of Internasals; 3. Distance from Posterior Eye Border to Lower Posterior Angle of the Last Upper Labial; 4. Distance from the Anterior Eye Border to Nostril; 5. Eye Diameter (Tokar, 1995)**

### Pholidosis

**Sq:** scales at mid body

**Vent:** number of ventral scales (classic method)

**Scd:** number of subcaudal scales.

**PIN:** number of post internasals (in the row of scales immediately behind the internal and between their external posterior corners).

**Lr:** number of loreals (in the row bordering the upper labials) between nasal and oculars.

**Fr:** number of scales in one midhead longitudinal row from the level of postoculars to postinternasals.

**Oc:** scales around eye.

**Lab:** number of upper labials.

## RESULTS AND DISCUSSIONS

### Redescription of *G. Conicus*

The description of *G. c. brevis* (Deraniyagala, 1951) was based on seven snakes collected from four localities in the arid zone of Sri Lanka. The holotype was collected at "Chavakachcheri, Jaffna", L=410.5mm, Vent=175, Scd=19 and deposited in Colombo Museum. The author provided a table with original measurements and scale counts for all seven snakes giving mean values of L=315.3mm, Vent=175.4 and Scd= 19.66.

Present data of *G. conicus* compared with Tokar's (1995) and Deraniyagala's (1951) data further strengthen Tokar's (1995) view that *G. conicus* is a monotypic species (Table 1). Here also the mean values of Sq, Vent and Scd differed except that of a Lab. Although there is a difference of means, the ranges overlap. These differences may be due to the small sample number of present data (Table 1.)

The present revision only includes *Gongylophis conicus*. Here we propose a key and revised description of the taxon.

### Identification Key for Boidae

1. Mental groove present..... *Eryx*.  
Mental groove absent.....*Gongylophis* 2
2. Body colour not uniform and full of brownish patches. Top dorsal patches are remarkable having irregular shape which usually joined from head to tail. Tail very short and thick with highly keeled scales of dry appearance, ends with pointed tip.....*G. conicus*

### Redescription of *Gongylophis conicus*

**Genus** *Gongylophis* Wagler, 1830

**Type species** (by subsequent designation of Fitzinger, 1843:24) *Boa conica* Schneider 1801

**Subgenus** *Gongylophis* Wagler 1830

**Type species** *Boa conica* schneider 1801

**Species included** *G. conicus* (Schneider 1801)

*Gongylophis conicus* (Schneider)

*Boa conica* Schneider 1801:268

*Eryx conicus* Dumeril & bibron 1844:470; Boulenger, 1893:124; Smith 1943:112.

*Eryx conicus brevis* Deraniyagala 1951:147; 1955:8.

*Eryx conicus* Stimson 1969:17

*Gongylophis conicus* Rage 1972:893.

*Eryx conicus* Rieppel 1978:185; Das 1991:92-97; Kluge 1993:340.

**Type:** ZMU 1470

**Type locality:** Tranquebar, India

### Diagnosis

Lateral margins of anterior half of parietal bone slightly concave. Pterygoideum narrow and elongated, with weak medial crest and 12-14 teeth; 5-6 teeth on palatinum. Anterior ends of nasals narrow and slightly curved exteriorly (Tokar 1989).

Head small, though not very distinct from neck, but sharply distinct from body. Rostral shield small, rounded lacking an angular shovel-like ridge. Scales on head and body keeled and small in size. Underside of the head also has small scales without mental groove. Eyes lateral and small with vertical pupil, Tongue color reddish. From 6 to 9 interocular shields and 4 post internasal shields. Tail end pointed and not curved, with highly keeled scales of dry appearance.

### Description

This is a medium sized snake with short body, pointed, straight tail. According to our data, for females: L 510-683mm (mean 597), Lcd 32-50mm (mean 41.50), and while for males: L 310-330mm (mean 320), Lcd 26-27 (mean 26.5). Tokar (1995) also reported that mean L and Lcd for females were always higher than those of males. However, Deraniyagala (1955) reported that some specimen may reach L 940mm; L/Lcd in both sexes varies within 10.6-23.3 (14.1±0.4).

Sexual dimorphism between male and female by *G. conicus* occurs in: L, Lcd, L/Lcd, Sq, Vent and Scd (table 2). There is a marked difference in body length of male and female. In the present study, male and female significantly differ in three characters: L, L/LCD and Sq. As Sq relates to the body length, hence it differs significantly. Tokar (1995) also commented that the absolute body length is the only external in which females differ from the males.

Frontal and parietal surfaces flat, sides of the head almost vertical, rostral small and rounded; eyes lateral; index YYM 0.88-1.20, YIN 2.8-4.6.

The body of the adults is full of patches except the ventral portion. Dorsal patches are irregular in shape usually continuously joined from head to tail (sometimes forming a zig zag line). Smaller, irregular shaped and discontinuous patches (looks like dark spots) occur on the sides. Dorsal body colour varies brown to reddish brown or chocolate; all patches have darker colour of deep brown to reddish brown. The ventral portion is pale yellow without spots.

### Pholidosis

Sq 44-52 (49.0 ±2.9439), Vent 164-181 (169.67±5.7927) [Das (1991) recoded Sq 40-55 and Vent 161-196 and Tokar (1995) reported Sq 42-52 and Vent 164-187 ], Scd 16-21 (18.33±1.6997), PIN 4, Lr 2-5 (3.33±0.9428), IOc 6-8 (7.0±0.8165), Fr 8-10 (9.0±0.8165), Oc 10-12 (11.16±0.8976), Lab 10-14 (12.0±1.2909) [Tokar (1995) recorded Scd 15-21, PIN 4, Lr 2-5, IOc 5-9, Fr 7-10, Oc 9-14, Lab 9-14 ]. Like Tokar (1995) in most of the snake first 3-4 upper labials are almost equal in height and only slightly higher than the rest. Pentapartite anal (with the largest scale in middle, guarded by two scales on each side) is divided in most times.

### Distribution

Present study and personal communication with other people of West Bengal (especially Mr. Dinabandhu Biswas, curator Snake Museum, Ajoypur High School) ensure that *G. conicus* is most abundant in West Bengal. We think that the population of sand boa also include *E. conicus* as the people have no idea of separating the two by diagnostic generic characters. Tokar (1995) reported that *G. conicus* inhabits the Indian subcontinent from eastern Pakistan to Assam and West Bengal, though Whitaker (1978) commented its occurrence in Bengal as rare.

### Systematics and Geographical Variation

A monotypic species showing no significant geographical variation.

### Natural History

*G. conicus* remains hidden in burrows and sandy soil. Most of the snakes are recovered from agriculture field and some are from roadside soil and river canal bank covered with grasses. According to Minton (1966) this species usually found on bare sandy soil, however, in Malabar (India), where the rainfall is higher, it inhabits soils covered with grass and bushes (Daniel 1983).

In West Bengal, *G. conicus* showed its activity in summer and rainy season. No snake is reported to be active in the winter. Minton (1966), Whitaker (1978) and Sorensen (1987) do not record activation in this species and assume that it is active the whole year. However, Misra et al. (1984) show it to be more torpid during the hottest season in some regions of India, and when the rains start the snake increases its activity significantly; the optimum temperature range is 20-30<sup>0</sup> C.

Beside night, *G. conicus* are found to remain active in early and late hours of the day. During the rainy season, they become active throughout the day, particularly in shady areas. In Pakistan, it is usually encountered after sunset (Minton, 1966), but in India it may be found active during the whole day, although at midday, when it is very hot, it seeks shade beneath bushes (Daniel, 1983).

The reproductive biology of *G. conicus* has been little studied. Misra et al. (1984) found that breeding occurs in May-June, while Sorensen (1987) reported that in South India mating occurs in November, this is an ovoviparous snake and births 6-11 young measuring 190-225mm, have been recorded between May and August (Sorensen, 1987).

Various rodents and small birds are the main food of *G. conicus*. The snake captured their prey in their burrows or sometimes by waiting concealed in the soil near the entrance of the burrow. Misra et al. (1984) mentioned that during the rainy season it feeds on frogs. Insects and skinks are also included in the diet of *G. conicus* (Deraniyagala, 1955).

The snake is very docile and never tried to bite furiously (by personal communication with different people like snake charmers and agriculture farmers). Sorensen (1967) reported that the snake always bites furiously when first captured; however, after a long time in captivity it becomes tame.

### Identification Key for *Eryx* Sp

1. Mental groove absent.....*Gongylophis* 2  
Mental groove present..... *Eryx* 3
2. Body colour not uniform and full of brownish patches. Top dorsal patches are remarkable having irregular shape which usually joined from head to tail. Tail very short and thick with highly keeled scales, ends with pointed tip.....*G. conicus*
3. Body colour uniformly reddish brown. Body uniformly thick and cylindrical. Tail end blunt and swollen with dark colour looks like another head..... *E. johnii*  
Body colour not uniform, often deep brown zig zag patch throughout the dorsal portion and ventral portion is whitish in colour with brown spots. Body heavily thick with a narrow head and tail. Tail end pointed but slightly curved..... *E. conicus*

### Redescription

**Type species:** *Eryx johnii* Russell 1801

**Type locality:** India

### Diagnosis

Body color is uniformly reddish brown, more or less cylindrical and thick body with small head. Head is with distinct snout, projecting over the lower jaw by 4-5mm. rostral shields well developed and visible from the top. Scales are small, keeled and shiny. Underside of the head also has small scales and without mental groove. Eyes lateral, very small with a vertical pupil. Tail end blunt and swollen with dark colour looks like another head

### Distinction of Related Species

The other species of *Eryx* reported from India is *E. conicus* in which body is not uniformly coloured and have deep brown zig zag patches throughout the dorsal portion and ventral portion is whitish in colour with brown spots. In *E. conicus* body is not cylindrical instead with a narrow head and tail. In this species tail tip is pointed and slightly curved, whereas in *E. johnii* tail end is totally blunt and swollen, looks like a head. Vent of *E. conicus* is semicircular or dome shaped (8-9mm in diameter) but in *E. johnii* vent is more or less straight and 8-9mm in length (Figure). Some more distinguishable features are tabulated in Table 3. Though body length of *E. johnii* is greater than that of *E. conicus* but tail length is relatively shorter in *E. conicus* as the value of L/Lcd in *E. conicus* (15.82) is greater than that of *E. johnii* (9.54). Number of ventral scales and subcaudal scales are also higher in *E. johnii* (204.66 and 28.33 respectively). But the number of upper labials is more in *E. conicus* (10.33) than that of *E. johnii* (7.33)

### Description

We examined only three specimens, L= 840-950mm (mean 896.67mm), Lcd= 89-101mm (mean 94mm), L/Lcd= 9.41-9.78 (mean 9.54) [both sexes included]; index YYM= 1.25 and YIN= 1.54.

### Pholidosis

Sq 55-62 (mean 58.33), Vent 195-218 (mean 204.67), Scd 25-32 (mean 28.33), Lr 3-4 (mean 3.33), IOc 8-9

(mean 8.33), Fr 5-6 (mean 5.33), Oc 9-10 (mean 9.33), Lab 7-8 (mean 7.33). Subcaudal scales are unpaired. Tough shovel shaped prominent rostral scale, 10-12 supralabials and 10-11 small scales surrounding eyes. Anal divided and subcaudal scales unpaired.

### Distribution

North and north- west India, not available from Jammu, Kashmir and north eastern part of India.

### Systematics and Geographical Variation

A monotypic species showing significant geographical variation.

### Natural History

*E. johnii* remains hidden in burrows and sandy soil. Most of the snakes are reported from mounds under buried bricks, rat holes, small caves, agriculture land, etc.

The snake is very slow with almost no aggression. Due to shy behavior, it likes to make a coil with head inside it.

It feeds on rodents and other animals like lizards and birds. It is a nocturnal species.

### CONCLUSIONS

Rippel (1978) placed the genus *Gongylophis* in the synonymy with the genus *Eryx* based on skull structure. In the present paper, the information so far available, including Rippel (1978) in natural history on *G. conicus* and *E. conicus* is doubtful as they never distinguished the genus on the basis of taxonomic characters. Now it can be commented that the natural history of both the genus is very similar as they belong to the family Boidae. But Tokar (1995) identified two characters (mental groove and structure of the tail) to separate *E. conicus* from *G. conicus*. We observed other two distinctive features like body colour and structure of rostral shield. All these four characters are summarized in Table 4. From these observations it can be concluded that *Gongylophis* and *Eryx* are two distinct genus and not synonymous to each other.

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### REFERENCES

1. Boulenger, G. A. (1893). Catalogue of the snakes in the British Museum (Nat. Hist). I. London XIII +448 pp., 26 Figures. 28 pls.
2. Daniel, J. C. (1983). The book of Indian reptiles. Journal of the Bombay Natural History Society, X + 141 pp.

3. Das, I. (1991). A new species of *Eryx* (Boidae: Serpentes: Squamata) from south- west India. Journal of the Bombay Natural History Society. 88: 92-97.
4. Deraniyagala, P. E. P. (1951) Some new races of the snakes *Eryx*, *Callophis* and *Echis*. Spolia Zeylanica, Colombo 26 (2): 147-150.
5. Deraniyagala, P. E. P. (1955). A coloured atlas of some vertebrates from Ceylon. Vol. 3. Serpentine Reptilia, Ceylon: Colombo Natural Museum Publ., Government Press, XIX+121 pp,
6. Dumeril, A. M. C. and Bibron, G. (1844). Erpetologie generale ou histoire naturelle complete des Reptiles VI. Paris: Roret 610 pp.
7. Fitzinger, L. I. (1843). Systema reptilium. Braumuller und Seidel. Vindobonae. 106+IX pp
8. Kluge, A. G. (1993). Calabaria and the phylogeny of erycine snakes. Zoological Journal of Linnean Society. 107:293-351.
9. Minton, S. A. M. D. (1966). A contribution to the herpetology of West Pakistan. Bulletin of the American Museum of Natural History. 134: 27-184.
10. Misra, S.; Manna, D. C. and Sitcar, A. K. (1984). Ecology, breeding biology and urinogenital system of Female *Eryx conicus* (Schneider). Journal of the Bengal natural History Society. 3(2) 110-113.
11. Rage, J. C. (1972). *Eryx* Daudinet *Gongylophis* Wagler (Serpentes, Boidae) Etude Osteologique. Bulletin Du Museum National d' Histoire naturelle. Paris 57: 893-898.
12. Rieppel, O. (1978). A functional and phylogenetic interpretation of the skull of the Erycinae (Reptilia Serpentes). Journal of Zoology, London 186: 185-208.
13. Russell, P. (1801). A continuation of an account of Indian serpents: containing descriptions and figures from various parts of India to the hon. Court of Directors of the East Indian Company. Volume 2.
14. Schneider, J. G. (1801). Historiae Amphibiorum naturalis et literarie. Jena 2: VI+374 pp.
15. Smith, M. A. (1943). 'Serpents'. The Fauna of British India, Ceylon and Burma: Reptilia and Amphibia, III. Taylor and Francis, Red Lion Court, Fleet Street, London.
16. Sorensen, D. (1987). The genus *Eryx*. Chicago Herpetological Society Bulletin. 23 (2): 21-25.
17. Stimson, A. F. (1969). Liste der rezenten Amphibien und Reptilien. Boidae. Das Tierreich 89: XI+49 pp.
18. Tokar, A. A. (1990). Taxonomy of snakes of genus *Eryx* (Serpentes: Boidae) from the USSR and Neighbouring countries. Ph. Dr. Degree Dissertation, Institute of Zoology, Kiev, 296 pp. (in Russian)
19. Tokar, A. A. (1991). A revision of the subspecies structure of juvenile sand boa, *Eryx jaculus* (L., 1758) (reptilian, Boidae). Herpetology of Central Asia, Leningrad: LISS Publ. 1: 18-41 (in Russian)
20. Tokar, A. A. (1995). Taxonomic revision of the genus *Gongylophis* Wagler, 1830: *G. conicus* (Schneider 1801) and *G. muelleri* Boulenger 1892 (Serpentes Boidae). Tropical Zoology 8: 347-360.



21. Tokar, A. A. (1996). Taxonomic revision of the genus *Gongylophis* Wagler, 1830: *G. colubrinus* (L. 1758) (Serpentes Boidae).
22. Whitaker, R. (1978). Notes on Indian snakes 1. Journal of the Bombay Natural History Society 682: 461-463.

**APPENDICES**

**Table 1: Comparative Data of *G. conicus* from India (Tokar, 1995), Present Study and Sri Lanka Based on Characters used for the Description of *G. c. brevis* (Deraniyagala, 1951)**

Character	India			Present Study			Sri Lanka		
	n	M±m	Min.-Max	n	M±M	Min.-Max	n	M±m	Min.-Max
Sq	46	46.28±0.39	42-52	6	49.0±1.44	44-52	8	45.13±0.35	44-46
Vent	43	173.12±0.7	164-187	6	169.67±2.84	164-181	8	174.37±2.8	165-190
Scd	45	17.58±0.23	15-21	6	18.33±0.83	16-21	8	19.37±0.37	18-21
Lab	45	12.07±1.2	11-14	6	12.17±0.52	11-14	7	13.14±0.51	11-15

**Table 2: Different Characters for Females and Males of *G. conicus***

Character	Females (Mean)(N=4)	Males (Mean)(N=2)	T-Test
L (mm)	597.00	320.00	4.668 *
Lcd (mm)	41.50	26.50	2.63
L/Lcd	14.49	12.07	3.10 *
Sq	51.00	45.00	6.89 *
Vent	171.50	166.00	1.00
Scd	19.00	17.00	1.32

\*significant

**Table 3: Some Comparative Features of *E. johnii* and *E. conicus***

Characters	<i>E. Johnii</i> (N=3)	<i>E. Conicus</i> (N=3)
L (mm)	896.67	553.33
Lcd (mm)	94.00	35.00
L/Lcd	9.54	15.82
YIN	1.54	2.57
YYM	1.25	0.97
Lab	7.33	10.33
Vent	204.66	170.67
Scd	28.33	18.00

**Table 4: Distinctive Features of *E. Conicus* and *G. Conicus***

Characters	<i>E. conicus</i>	<i>G. conicus</i>
Body colour	Dorsal side have dark brown blotches with deep black margin	Blotches are not so dark and without any Margin
Rostral shield	Rostral shield on head is highly Developed and in the form of angular shovel like ridge	Rostral shield is very small but internasals are highly developed
Mental groove	Present	Absent
Tail tip	Pointed and slightly curved	Pointed and slightly curved Scales of dry appearance and not curved



**Figure 2: Tail Tips of *E. conicus* (Left) and *G. conicus* (Right) it Shows Curved Tail in *E. conicus* But Straight in Case of *G. conicus***



**Figure 3: Comparison of Body Color between *E. conicus* (Left) and *G. conicus* (Right) Dark Brown Blotches with Black Margin in *E. conicus* Whereas Blotches are Not So Dark Without Prominent Margin in Case of *G. conicus***