



E-ISSN: 2320-7078

P-ISSN: 2349-6800

www.entomoljournal.com

JEZS 2025; 13(2): 106-111

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Received: 05-02-2025

Accepted: 07-03-2025

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Double-headed (Dicephalic) snakes: A review of some records of occurrence in India with note on a dicephalic snake from Dibrugarh, Assam (India) in 1953

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Abstract

In this article some reports of dicephalic snakes in India are reviewed. Records of 32 specimens of dicephalic snakes from India belonging to 10 species are presented. Report on an unidentified dicephalic snake recorded in Dibrugarh, Assam in 1953 is also added.

Keywords: Snake, dicephalic, India, Dibrugarh, Assam

Introduction

Dicephalic (Greek 'di'=double, 'kephale'=head) snakes, commonly known as double-headed snakes exhibit axial bifurcation and duplication of the anterior part of their body. Dicephali (or Bicephali) is a kind of Polycephaly (Greek 'poly'=many) ^[1, 2]. It is a kind of congenital malformation ^[3] and considered as an extreme case of developmental instability due to genetic disorder and /or environmental effects.^[4] A number of possible causes of this abnormality have been attributed. These include problems during embryonic development like incomplete division, partial fusion and regeneration in the embryos besides anoxia and very low or high temperature. There may be genetic factors like inbreeding depression or hybridisation. Further, the causes may be physiological (*viz.* metabolic toxicity) or environmental (*viz.* environmental pollution, toxic radiations, chemical toxicity in captivity)^[5].

Dicephalic individuals are recorded in different groups of vertebrates ^[4]. Paleontological record of a dicephalic fossil reptile (120 Myr) found in China is a member of the extinct diapsid reptilian order Choristodera ^[6]. Aelianus BC 250 gives records of polycephaly in birds that he saw or heard.^[7] Dicephalism is relatively common in snakes ^[4, 8]. There are several cases reported in snakes ^[2, 5]. Dicephalism may be of different degrees, may be partial and sometimes associated with other types of axial bifurcation ^[9, 10]. In snakes, sometimes Dicephalism is associated with bifurcation or duplication of the tail, leading to amphidicotomous snakes ^[9, 11].

Dicephalism or anterior dichotomy in snakes should not be confused with so called 'double-headed' snakes either mythological or mistakenly believed snakes with blunt short tails ^[1, 5]. The so called 'double-headed snakes' are sometimes referred to as 'double engine' snakes. ^[12] These snakes are used by jugglers and snake charmers for trade and exhibition. People in India are familiar with such so called 'double-headed' snakes. John's sand boa *Eryx johnii* (Russell, 1801) is most commonly used snake, often mutilating the blunt tail with markings and cutting a transverse incision at the tip to suggest eyes and mouth respectively ^[13, 14]. Vernacular names of this species (*viz.* 'Do muha', 'Dumui' etc.) also support the belief all over India that the snake has two heads and the heads are alternatively in action every six months ^[14].

Dicephalic snakes rarely survive for a long time in nature. Most of them are stillborn. When born alive they live for a few minutes, hours or days ^[5, 15, 16]. Thus, majority of reported cases are juveniles and newly hatched snakes ^[3]. Their short lifespan is generally attributed to problem with feeding and even digestion ^[17]. They are disinclined to feed because they are unable to move in a coordinated way resulting failure to capture prey.^[18] Yet another cause is their failure in escaping predators successfully ^[2, 6, 18, 19]. However, in captivity these can

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survive for many years due to artificial feeding and absence of predator [2, 5, 21, 22]. There was an example of Common Sand Boa *Eryx conicus* (Schneider, 1801) in Karnataka where the twin brain smoothly cooperated and coordinated as a functionally single headed animal [23]. Dicephalic snakes may attain full life and even can produce normal offspring. [24]. Records of such snakes survived 20 or more years in captivity are there including Black Rat Snake [25, 26]. There are records of dicephalic San Diego Gopher Snake, *Pituophis catenifer catenifer nnectens* lived 21 years 1 month in Los Angeles Zoo and Pacific Gopher Snake, *Pituophis catenifer catenifer* more than 22 years at the aquarium of Steinhart, San Francisco. [5]

There is a historic record of a dicephalic snake in China. In Lungheng, a Chinese classic text by Wang Chong it is recounted that Sunshu Ao (630-593 BC), a Chinese hydraulic engineer and politician who became the prime minister of King Zhuang saw a snake with two-heads in his childhood. The snake was killed and buried by Sunshu Ao to save the people from 'death' due a prevailing superstition [27]. Another early report of a dicephalic snake was by Aristotle BC 325. In his 'Generation of Animals', Aristotle wrote that he had seen a dicerphalic snake [28]. Referring to Pammenes of Thebes (4thc.BC), Aelianus BC 250 gives a record of Two-headed snakes from Egypt [29]. Although rare in nature there are records of thousands of such cases since these classic records. According to an estimate dicephalic snakes occurs once in 10,000 snakes [30]. In a compilation published in 2021 here are records of 2,086 dicephalic cases in 227 species of snakes under 116 genera and 13 families known from all over the world [31].

Not less than 41 documented cases of axial bifurcation and duplication of heads of snakes are there in India [32]. In the present article reports of occurrence of some of the Dicephalic snakes in India till 2022 AD are reviewed.

Materials and Methods

Reports of occurrence of dicephalic snakes in India are reviewed on the basis of the available original research articles, museum catalogues and web pages of blogs. Further, reports of such snakes published in print media, supported by research articles and those appeared in electronic media supported by pictures and video are also documented and presented after careful examination. Reports are reviewed in respect of their taxonomic identity, locality of occurrence and available information related to stage of life-history stage (juvenile or adult), lifespan, measurement (in mm), release, death and preservation status. The report of the dicephalic snake in Dibrugarh was collected from the library of D.H.S.K. College.

Results

Available reports of 32 dicephalic snakes in India under review are presented chronologically.

1. John Shortt reported notice of a dicephalic snake to the Linnaean Society on the 15th march, 1866 [33]. The dicephalic water snake was caught alive in the backwater on the Eastern Coast of India [13, 33, 34]. Most probably it was a young *Hydrophis sublaevis* Gray measuring 317.5 mm long with a circumference of 28.57 mm at the thickest part of the body [33]. Current name of this species is *Hydrophis cyanocinctus* Daudin, 1803 [13]. It was sent to the Museum of the Royal College of Surgeons, London [33].
2. In 1873, an article on a dicephalic snake written by G. E.

Dobson appeared in the Proceedings of the Asiatic Society of Bengal [35]. The specimen of the dicephalic *Lycodon aulicus* (Linnaeus, 1758) was presented by Dr.R.F. Thompson, the Civil Surgeon of Hoogly. Total length of the specimen from the snout of one head to the tip of the tail measured 185.42 mm and snout to the union 22.86 mm [35, 36, 37]. The specimen bears the Indian Museum Registration No.7965 [38].

3. In the article by G. E. Dobson mentioned above, there is a report of another dicephalic snake. [35] The specimen sent by the Nawab of Dacca of then British India to the Museum of Asiatic Society was that of *Naja tripudiens* Merr [35, 36, 37]. Presently known as *Naja naja* (Linnaeus, 1758) [39]. Total length of the specimen was 457.2 mm [35], and it is preserved in the Indian Museum (catalogue No.8319) [38].
4. In 1874, Edward Nicholson wrote in his book 'Indian Snakes' about a young dicephalic snake of the species *Tropidonotus quincunciatus* of 'unknown origin', found in Madras Museum [40], later known as *Tropidonotus piscator* [13] or a species of the genus *Natrix* [34]. These names are now considered as synonyms of *Fowlea piscator* (Schneider, 1799) [39].
5. F.Wall in 1905 mentioned that he examined a dicephalic snake found in Faizabad Museum [13]. The young snake, evidently a hatchling of the species *Lycodon aulicus* (Linnaeus, 1758) measured 139.7 mm long with 22.22 mm head and neck. The heads, placed side by side are connected by web except the free snouts of 5.08 mm [13].
6. A specimen of double-headed snake was procured by Zoological Survey of India in 1929. [36]. It was a docephalic Russell's Viper *Vipera russelii*, presently *Daboia russelii* (Shaw & Nodder, 1797) [39]. The juvenile snake was 216 mm long caught at Tarakeswar in the district of Hoogly, West Bengal and purchased May, 1929. The specimen has scale count of ventrals 165 and sub caudals 48. There are differences in length, breadth and scales round the eye in both the heads. [36]. This abnormal specimen bears Z.S.I. Registration N0.20434 [34].
7. K.Balakrishna Menon in 1953 reported a dicephalic snake from Police Reserve Area of Dibrugarh City (27.484357, 94.909440) Assam, India. It was photographed and preserved in the Department of Zoology, D.H.S.K.College, Dibrugarh, Assam. [41] A note on this specimen is added to this article.
8. In 1957, V. R. Jha and P.D. Gupta reported a dicephalic juvenile common krait *Bungarus caeruleus* (Schneider, 1801) found in Lakhaoti, district Bulandshahar of Uttar Pradesh. [37] The snake was beaten to death and broke the body into two pieces. The specimen measuring 260 mm in length was presented to the Ewing Christian College Museum, Allahabad, now Prayagraj [37].
9. In 1969 a dicephalic Dog-faced Watersnake, *Cerberus rhynchops* (Schneider, 1799) was collected near Madras (Chennai) City, which was reported by Romulus Whitaker in 1971 [10]. This species is also known as *Cerberus rynchops* (Schneider, 1799) [39]. The healthy live specimen was 350 mm long. [10] [25] [42]
10. In the article mentioned above in Sl. No 9, Romulus Whitaker reported a snake of the species described as *Natrix piscator*. The snake obtained from near Nagercoli, Tamil Nadu, [10] documented as *Xenochrophis piscator* [25, [42], is presently known as *Fowlea piscator* (Schneider,

- 1799) [39].
11. S. K. Talukder in 1977 reported dicephalic specimen of *Xenochrophis piscator* in the national Collection of Zoological Survey of India [34]. The specimen of the snake species now known as *Fowlea pscator* (Schneider, 1799) [39] was collected from Chaurasi, Singbhum dist., Chatonagpur plateau, Bihar 8 km. south of Inanpur. Total body length was 180.8 mm, head length 10.2 and tail 53.3 mm. The specimen was collected on 26.11.1948 and presently in the collection of Zoological Survey of India bearing Registration No.23267 [34].
 12. On 4th June, 1983 a specimen of Common Sand Boa (Russell's Sand Boa) *Eryx conicus* (Schneider, 1801) the 'first of this kind' was collected by a farmer of the village Hole-Alur, District Dharwar, Karnataka [23]. It was maintained alive for two months giving earthworms as food. The snake, measured 200 mm long and 40 mm in girth in the trunk region. Later the specimen was donated by Shri M.V.Waddin, Asst. Conservator of Forest to the museum of Karnataka Science College, Dharwad [23]. The preserved dicephalic snake specimen is in the museum of the Zoology Department of the College [43]. (Fig 1), (Fig 2).
 13. In April, 1984 a dicephalic Russell's Viper was born in Pune, Maharashtra [16]. A captive female Russell's viper, described as *Vipera russellii*, presently known as *Daboia russellii* (Shaw & Nodder, 1797) [39] gave birth to a two headed young in Poona Serpenterium, Pune, Maharashtra. The 'viperling' died within few minutes after birth. An examination in the neck region revealed a single trachea leading to the lungs [16].
 14. On 3rd April, 1986, a dicephalic Chekered Keelback was received in Nandankanan Zoological Park, Odisha. [42] The hatchling of the snake was described as *Xenochrophis piscator*, presently known as *Fowlea pscator* (Schneider, 1799) [39] about one week old snake was received through a villager of Kalapathar, district Cuttack, Odisha. It was collected from the bank of a village tank. The length of the specimen was 195 mm from the tip of snout of each head to the tip of tail. The snake with two equally well developed head did not take any food and died after two weeks [25, 42].
 15. In 1988 there was a report of a dicephalus specimen of Common Sand Boa (Russell's sand Boa) *Eryx conicus* (Schneider, 1801) collected from a place in the Shimoga district of Karnataka [44].
 16. On the 9th June, 1994 a double-headed Russell's Viper was born at Calcutta Snake Park Kolkata [45]. The snake was reported as *Vipera russellii*, presently known as *Daboia russellii* (Shaw & Nodder, 1797) [39]. The snake survived for 23 days in captivity [42, 45, 25]. Out of the ten live young gave birth by a captive female Russell's viper this was the only dicephalic snake. Some activities of the young snake including drinking, eating and changing its first slough were noted. It is also reported that, out of more than five thousand Russell's Vipers born in the snake park this was the only two headed viper born [45].
 17. On 23rd July 2006, a two-headed Russell's viper *Daboia russellii* (Shaw & Nodder, 1797) was captured by local villagers from an agricultural field near Mirpur village in Kheri District (U.P.). It was a two or three month old snake with a body length of about 304.8 mm long. Its problematic feeding behavior was noted. This very slowly moving snake died in captivity after 4 days on 27th July 2006 [2, 46].
 18. On the 14th Aug. 2008 a dicephalic juvenile Russell's viper *Daboia russellii* (Shaw & Nodder, 1797) was rescued from Saswad Taluka Purandar, Pune, Maharashtra. The snake died within a day and was deposited in the collection of the Western Regional Centre of Regional Zoological Survey of India, Pune (Registration No.1038) [2].
 19. On 6th July, 2013 a dicephalic Juvenile Russell's viper *Daboia russellii* (Shaw & Nodder, 1797) was rescued from a place near Mapusa, Bastora, Goa died after two days in captivity [2].
 20. On the 10th Aug, 2013 a dicephalic Spectacled Cobra *Naja naja* (Linnaeus, 1758) rescued from a residential area of Wadi-Bodegaon, Tq. Karanja (Lad.), Washim district of M.S. Approximate length of the snake was 431.8 mm. This is the 1st known published record of this kind [24].
 21. On the 13th Aug, 2013, the 'first ever record' of a dicephalic Red-tailed Bamboo Pit Viper *Trimeresurus erythrurus* (Cantor, 1830) was there from near Chhipphir Village, Lunglei District, Mizoram, a place 62.4 km South of Aizawl. The snake was captured by local villagers. Total length of the snake was approx. 310 mm. The snake was released to the surrounding forest [21].
 22. In 2013 A dicephalic common Sand Boa *Eryx conicus* (Schneider, 1801) was reported from Vatakara area, district Kozhikode that survived only for a few days [25, 47].
 23. On the 19th Feb. 2014, a juvenile Trinket Snake *Coelognathus helena* (Daudin, 1803) was rescued from Kiroli Chakan, Pune, Maharashtra. The snake was taken to Pimpri-Chinchwad Zoo which also known as Nisargakavi Bahinabai Chaudhari Prani Sangrahalaya, Pune [2].
 24. On 4th April, 2014 a double headed Checkered Keelback *Fowlea pscator* (Schneider, 1799) was seen crawling past a house in the village of Bardwan, West Bengal and a picture was captured by Apurba Ghosh before it disappeared in the bushes within seconds [48].
 25. In July, 2016 a Common Sand Boa *Eryx conicus* (Schneider 1801) was recorded from Raipur's Nandanvan, Chattisgarh. According to K.M. Dhangar, a senior forest official the snake was 100 mm long and this kind of snake was never seen in Raipur before [49].
 26. In the year 2017 a book entitled 'Mizoram Rul Chanchin' was published. Pictures of dicephalic '*Trimeresurus sp.*' appeared on the page No.6 and Back Cover of the book [50].
 27. In 2018 there was a report of dicephalic Common Sand Boa *Eryx conicus* (Schneider 1801) from Shimoga district, Karnataka [25].
 28. On 5th may 2019 a 160 mm long juvenile dicephalic Common Sand Boa *Eryx conicus* (Schneider 1801) was found in Meenchanda area, district Kozhikode, Kerala. The snake died on 3rd July, 2019 after almost two month in captivity [25].
 29. According to a report made public on 11th December 2019, a dicephalic Monocled Cobra *Naja kaouthia* Lesson, 1831 was found Ekarukhi village of Bela forest range, Midnapore, W.B. Soma Chakravarty, a zoologist identified the snake. Kaustubh Chakravarty a herpetologist of the forest department reported that he was unable to rescue the snake as the villagers who believe in mythology refused to hand over the snake to

the department^[51, 52].

30. Reported on the 7th May, 2020 a dicephalic wolf snake, *Lycodon aulicus* (Linnaeus, 1758) 140 mm long with two fully formed heads was found by Rakesh Mohalick photographer and wildlife enthusiast in a house in the Dehnikikote forest range of Keonjhar Wildlife Sanctuary in Odisha. Susanta Nanda, an Indian Forest Service Officer shared the 26 second video of the snake on twitter. The snake was released to the forest^[52].
31. In 2020, a two-headed Russell's viper *Daboia russelii* (Shaw & Nodder, 1797) was rescued from Gandhare Road area, Kalyan, Maharashtra. The video of the snake was shared by Susanta Nanda, an Indian Forest Service Officer. The snake was to be handed over to the Haffkine Institute, Parel, Mumbai^[53].
32. In 2022 a dicephalic Common Sand Boa (Russell's Boa) *Eryx conicus* (Schneider 1801) was rescued from a temple in Deoli area of Tonk District, Rajasthan^[54].

Historic report of a dicephalic snake from Dibrugarh City, Assam^[41]

There is a historic record of a dicephalic snake from Dibrugarh town, Assam, India in 1953 presented by Prof. K. Balakrishna Menon, Department of Zoology, D.H.S.K.College. A dicephalic snake was caught alive in the Police Reserve Area (27.484357, 94.909440) of the present Dibrugarh City, Assam. When died, the specimen was preserved and kept in the museum of the Department of Zoology, D.H.S.K.College. The report was published under the title 'Double Headed Snake' in 'The College Alochani' (The College Journal) D.H.S.K.College, Dibrugarh, Assam. 1953, 7: 57-59.

The snake was caught from the Police Grounds of Dibrugarh city by a student of the college named M.U.Ahmed. The student who caught the snake stated that the snake was moving very fast over the grasses and he followed due to inquisitiveness. When the snake was agitated it raised both its heads as if to strike. The snake was caught alive and kept in a glass case and was found dead after few hours. The colour of the snake was light brown in dorsal surface with irregular dark and white patches. Ventral surface was white in colour. Although the identity of the snake was not confirmed, according to the author it had a superficial resemblance with the Sand Snakes found in Rajasthan and presumed to be a non venomous snake of the family Boidae. The snake was young with a length of 160 mm excluding the heads. Each head had a length of 8.89 mm and width 6.35 mm (approx). Extending backwards from the point of bifurcation of the heads, along the mid-dorsal and mid-ventral lines there is a deep groove of 3.81mm in length. The groove was assumed to be the point of bifurcation of the vertebral column. An x-ray photograph was taken by a radiologist of the Assam Medical College, but with no satisfactory result. Therefore, it was not possible to conclude with certainty the point from where the bifurcation of the vertebral column had commenced. Photograph of the snake was taken carefully by Nani Chowdhury of Arts Gallery, the renowned photographer and journalist of the City. The specimen was preserved in the museum of the Department of Zoology of D. H. S. K. College. The present author could recover neither the photograph nor the preserved specimen of the snake documented by Prof. K. B. Menon in 1953 who left the College in late fifties of the last century. However, the fact was supplemented by personal communication with Prof. Prasenjit Chowdhury, (Dept. of

English, D. D. R. College Chabua, Assam) a son of photographer journalist late Nani Chowdhury.



Fig 1: Dicephalic (Double-headed) Common Sand Boa, *Eryx conicus* (Schneider, 1801). Preserved (in 1983) in the Museum of Zoology Department, Karnataka Sc. College, Dharwad. (pic. by Sri. Naveev Pyatimani, courtesy of Dr. R. D. Sanakal, HoD, Zoology)^[43]



Fig 2: Dicephalic (Double-headed) Common Sand Boa, *Eryx conicus* (Schneider, 1801). Preserved (in 1983) in the Museum of Zoology Department, Karnataka Sc. College, Dharwad. (pic. by Sri. Naveev Pyatimani, courtesy of Dr. R. D. Sanakal, HoD, Zoology)^[43]

Discussion and conclusion

Altogether 32 documented works on eleven identified species, one identified up to genus level and one unidentified specimen (from Dibrugarh, Assam) of dicephalic snakes in India are reviewed. The review work shows the highest number of dicephalism, 07 specimens each in two species viz. *Eryx conicus* (Schneider, 1801) and *Daboia russelii* (Shaw & Nodder, 1797). Number of dicephalic specimens in three other species are- *Fowlea pscator* (Schneider, 1799) - 05, *Lycodon aulicus* (Linnaeus, 1758)- 03 and *Naja naja* (Linnaeus, 1758)- 02. There are 01 specimen each in seven other species viz. *Naja kaouthia* Lesson, 1831, *Hydrophis cyanocinctus* Daudin, 1803, *Bungarus caeruleus* (Schneider, 1801), *Cerberus rhynchops* (Schneider, 1799), *Coelognathus helena* (Daudin, 1803), *Trimeresurus erythrurus* (Cantor, 1830) and *Trimeresurus sp.* It is expected that this article will be useful for a thorough review of all dicephalic snakes recorded from India which may be around 50 in number.

Acknowledgments

Thanks due to Dr. (Mrs.) M. S. Salunke Principal, Karnataka Science College, Dhawad for permission, Dr. (Smt.) Rajeshwari D. Sanakal HoD, Zoology, for necessary arrangement & communication and Sri Naveev Pyatimani, Taxidermist for the photographs of the dicephalic snake specimen in the Museum of Zoology Department of the College. Thanks also due to Gordon M. Burghardt, University of Tennessee for a research article. My sincere thanks to Prof. Prasenjit Chowdhury, (Rtd. Dept. of English, D. D. R. College Chabua, Assam), son of the photographer journalist Late Nani Chowdhury for information.

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