Short Communication

On the distribution, taxonomy, and natural history of the Indian Smooth Snake, *Coronella brachyura* (Günther, 1866)

Harshil Patel, Raju Vyas, and Shantilal K. Tank

1Department of Biosciences, Veer Narmad South Gujarat University, Surat-395007, Gujarat, INDIA 2Department of Biosciences, Veer Narmad South Gujarat University, Surat-395007, Gujarat, INDIA

Abstract.—The Indian Smooth Snake *Coronella brachyura* is one of the least studied endemic species of snake from India with regard to distribution, taxonomy, and natural history. In the present study, we verified literature, museum specimens and distributional records which enabled us to correct erroneous reports and map the distribution of this species. Additionally, we provide information on taxonomy, morphology, microhabitat, and behavior of the species based on three live specimens and voucher specimens in the collection of the Bombay Natural History Society, Mumbai.

Key words. Colubridae, endemic, India, rare, morphology, scalation

Members of colubrid snake genus *Coronella* Laurenti, 1768 are among the least studied snakes across the world. The genus is represented by three species namely *C. austriaca* Laurenti, 1768, *C. girondica* (Daudin, 1803), and *C. brachyura* (Günther, 1866) (Wallach et al. 2014; Uetz and Hošek 2015). The former two species are distributed in western Palaearctic (from southern Norway in the north to northern Algeria in the south; Portugal in the west to northern Iran in the east) and the latter, endemic to India (Wallach et al. 2014; Uetz and Hošek 2015). The former two species are distributed in western Palaearctic (from southern Norway in the north to northern Algeria in the south; Portugal in the west to northern Iran in the east) and the latter, endemic to India (Wallach et al. 2014; Uetz and Hošek 2015).

Günther (1866) described this species from Poona (Pune) in the Indian state of Maharashtra. Subsequently, the species was reported from several localities based on which the distribution range of the species was considered to be restricted to three states in the western part of India namely; Maharashtra, Gujarat, and Madhya Pradesh. Reported localities from Maharashtra state are: “Wun, S. E. Berar” (now Wani, Yavatmal district) referred by Blanford (1870), Anderson (1871), Theobald (1876), Boulenger (1890), Sclater (1891), and Wall (1923); Chink Hill and Kurduwadi in Solapur district (Lindberg 1932); Visapur, Ahmednagar district (Gharpurey 1935); Marole (Andheri)—Salsette Islands, Mumbai (Abdulali 1935); Nashik (Mistry 2005); Melghat, Amravati district (Nande and Deshmukh 2007); Latur, Latur district (Kamble 2010); Khed, Pune district (Ghadage et al. 2013), and Jalna (Z. Mirza, pers. comm.). Furthermore, the species was reported from Gujarat state (Vyas and Patel 2007) and Ujjain, Madhya Pradesh state (Ingle and Sarasvan 2011). Sarasin (1910) referred to this species but did not provide any specific localities. Whitaker and Captain (2004) gave the range of this species as “few localities in Maharashtra.” According to Smith (1943) the range of this species is “Northern India. Poona district and Visapur, near Bombay; S. E. Berar,” however, it is unclear why he included “Northern India” in its range. In the recent past, we came across three live individuals of *C. brachyura* from Surat, Gujarat. Based on museum specimens, published literature, and additional data from live individuals we provide additional morphological and distributional data, as well as natural history observations for this poorly known species.

Correspondence. Email: harshilpatel121@gmail.com (Corresponding author) razoovyas@hotmail.com drtanksk@gmail.com
Material and Methods

Three live specimens (two females and one male; field number assigned as: NCS 01-03) rescued by snake rescuers and brought to us (they were photographed, examined, and released at the same locality within a few days), and seven specimens catalogued in the museum of Bombay Natural History Society (BNHS), Mumbai as *Coronella brachyura* from six localities were also examined. The pholidosis and morphometric data of museum specimens and live specimens are given in Table 1.

Ventral scales were counted following the method proposed by Dowling (1951). Head measurements of voucher specimens were measured with a digital calliper to the nearest 0.01 mm and other body measurements were recorded with string and a ruler to the nearest mm. Descriptions and mensural characters were compared with available literature (Smith 1942; Mistry 2005; Vyas and Patel 2007). The number of dorsal scale rows were counted at approximately one head length behind the head, midbody, and one head length before the vent, respectively. Subcaudal counts reported here do not include the terminal scute. The supralabials touching the eye are given in brackets after the number of supralabials. Values for symmetric head characters are given in right/left order. Abbreviations used to describe scalation and other comparable characters are: V, ventrals; SC, subcaudals; D, dorsal rows; SL, supralabials; L, loreal; PrO, preocular; PO, postocular; T, temporal; IL, infralabial; SVL, snout-ventral length; TaL, tail length; TL, total length; HL, head length; and HW, head width.

**Results**

*Morphology and coloration:* Head short, comprising 2.3% of total length; longer than wide (HL/HW ratio: 1.55); slightly distinct from neck; eyes circular with round pupil; nostrils large; body circular. Dorsal color of live individuals was olive brown, with indistinct light variegation on head and forebody (Fig. 1); labials pale olive; lateral scale rows dark brown, forming indistinct lateral stripe on each side from nostril to tail, which is prominent between nostril to eye; underside cream white.

*Lepidosis:* Dorsal scale rows (DSR) smooth, in most specimens 23:23:19 (23:23:21 in BNHS 3407; 23:23:17 in NCS 2); with single apical pit on the posterior margin. Ventrals 209–237 (maximum 224 *fide* Smith 1943); anal undivided; subcaudals 43–54 (46–53 *fide* Smith 1943); rostral wider than high, scarcely visible from above; 2 internasals, wider than long; 2 prefrontals, as long as wide, longer than the internasals; frontal bell shaped, slightly longer than wide; parietals longer than wide, slightly longer than frontal; 1 loreal, as long as high, rarely longer than high; 1 preocular reaching top of head; 2 postoculars; 2 anterior temporal scales; 2, rarely 1 posterior temporal scale(s); 8, sometimes 9 (*8 fide* Smith 1943) supra-

![Fig. 1. Dorsal aspect of *Coronella brachyura* in life, from Surat, Gujarat, India.](image-url)
Distribution, taxonomy, and natural history of *Coronella brachyura*

Labials, the 4th and 5th, sometimes 5th and 6th and rarely 4th to 6th (4th and 5th *fide* Smith 1943) touch the eye (Fig. 2); 9–11 infralabials.

**Distribution:** The present study and published records (Günther 1866; Blanford 1870; Anderson 1871; Theobald 1876; Boulenger 1890; Scarlet 1891; Wall 1923; Lindberg 1932; Gharpurey 1935; Smith 1943; Whitaker and Captain 2004; Mistry 2005; Vyas and Patel 2007; Nande and Deshmukh 2007; Ingle and Sarsavan 2011; Ghadage et al. 2013) shows that the species is narrowly distributed in western India (Table 2).

Four museum specimens BNHS 793, 796, 798, and 3407 were examined. Two specimens BNHS 795 and 797 were damaged; therefore unable to examine for pholidosis and morphometric data. The specimen BNHS 794 (Fig. 3) from Marol, Mumbai collected and reported as *C. brachyura* by Abdulali (1935); was re-examined by the senior author. It had 23 scale rows at mid body; 217 ventrals; anal scale damaged; 96+ subcaudals, divided; 8 supralabials; 1 presubocular; 2+3 temporals; and measured 285 mm total length. All these characters clearly matched with *Argyrogena fasciolata* (Shaw, 1802). The coloration of this specimen has faded likely due to long

Table 1. Scale counts, measurements (mm), and collection details for specimens of *Coronella brachyura*.

<table>
<thead>
<tr>
<th>Specimen No</th>
<th>BNHS 793</th>
<th>BNHS 796</th>
<th>BNHS 798</th>
<th>BNHS 3407</th>
<th>NCS 1</th>
<th>NCS 2</th>
<th>NCS 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locality</td>
<td>Visapur, Ahmednagar, Maharashtra</td>
<td>Talegaon, Pune, Maharashtra</td>
<td>Bhopal, Madhya Pradesh</td>
<td>Piplod, Surat, Gujarat</td>
<td>Surat, Gujarat</td>
<td>Piplod, Surat, Gujarat</td>
<td>Piplod, Surat, Gujarat</td>
</tr>
<tr>
<td>Date</td>
<td>—</td>
<td>October 27, 1956</td>
<td>July 1945</td>
<td>March 2006</td>
<td>December 5, 2012</td>
<td>February 12, 2014</td>
<td>February 17, 2014</td>
</tr>
<tr>
<td>TL</td>
<td>375</td>
<td>523</td>
<td>507</td>
<td>495</td>
<td>410</td>
<td>620</td>
<td>560</td>
</tr>
<tr>
<td>SVL</td>
<td>322</td>
<td>447</td>
<td>443</td>
<td>445</td>
<td>360</td>
<td>552</td>
<td>480</td>
</tr>
<tr>
<td>TaL</td>
<td>53</td>
<td>66</td>
<td>64</td>
<td>50</td>
<td>50</td>
<td>68</td>
<td>80</td>
</tr>
<tr>
<td>V</td>
<td>221</td>
<td>216</td>
<td>209</td>
<td>237</td>
<td>223</td>
<td>223</td>
<td>220</td>
</tr>
<tr>
<td>A</td>
<td>Undivided</td>
<td>Undivided</td>
<td>Undivided</td>
<td>Undivided</td>
<td>Undivided</td>
<td>Undivided</td>
<td>Undivided</td>
</tr>
<tr>
<td>SC</td>
<td>45</td>
<td>49</td>
<td>47</td>
<td>45</td>
<td>47</td>
<td>43</td>
<td>54</td>
</tr>
<tr>
<td>SL</td>
<td>9(5,6)/8(4,5)</td>
<td>8(4,5)/8(4,5)</td>
<td>8(4,5)/8(4,5)</td>
<td>8(4,5)/8(4,5)</td>
<td>9(5,6)/8(4,5)</td>
<td>9(4 to 6)/8(4,5)</td>
<td>8(4,5)/8(4,5)</td>
</tr>
<tr>
<td>L</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
</tr>
<tr>
<td>IL</td>
<td>10/10</td>
<td>9/10</td>
<td>10/10</td>
<td>9/9</td>
<td>10/10</td>
<td>11/11</td>
<td>9/9</td>
</tr>
<tr>
<td>PreO</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
<td>1/1</td>
</tr>
<tr>
<td>PO</td>
<td>2/2</td>
<td>2/2</td>
<td>2/2</td>
<td>2/2</td>
<td>2/2</td>
<td>2/2</td>
<td>2/2</td>
</tr>
<tr>
<td>T</td>
<td>2+2/2+2</td>
<td>2+2/2+2</td>
<td>2+2/2+2</td>
<td>2+1/2+1</td>
<td>2+2/2+2</td>
<td>2+2/2+2</td>
<td>2+2/2+2</td>
</tr>
<tr>
<td>Sex</td>
<td>ND=Not Determined</td>
<td>ND</td>
<td>ND</td>
<td>Female</td>
<td>Female</td>
<td>Male</td>
<td></td>
</tr>
</tbody>
</table>
term preservation. However, it shows remains of 27+ vestigial whitish bands in the forebody which became paler in posterior half and became indistinguishable—which is found in juveniles of *A. fasciolata*. Based on our observations we here conclude that the specimen cited by Abdulali (1935) is conspecific with *A. fasciolata* and is an erroneous report from Mumbai, and should be removed from the known distribution range of *C. brachyura*.

Vyas and Patel (2007) collected *C. brachyura* from Surat, Gujarat and in the same publication they also presented two more localities (Ahmedabad and Bhavnagar) from Gujarat based on photographs of a striped snake which they attributed to *C. brachyura*. However, specimens were not available to the authors and hence the exact identity of specimens from these two localities remains in question. Fresh specimens are needed to confirm the presence of *C. brachyura* from these localities.

**Habit, habitat, and natural history:** *Coronella brachyura* are found in plains and hillocks; majority of known localities are situated around 500 m a.s.l. The species appears to occur in a wide range of habitats from arid scrub lands to dry deciduous forests; they are also found in human habitations. Two live individuals (NCS 02 and 03) were found in a water body near a newly developing urban area; NCS 01 was found near a water body. The specimens were active during day time and did not show any aggression when handled. Live individuals were kept for a few days; juveniles of *Hemidactylus* sp. were offered food but none accepted. However, some authors reported that the species feeds on juvenile geckos in captivity (Whitaker and Captain 2004; Ingle and Sarsavan 2011).

**Discussion**

**Distribution:** Our observations coupled with published information of the species shows this endemic species is widely distributed encompassing a geographical area of 2,80,000 sq. km across three Indian states, namely Maharashtra, Madhya Pradesh (west), and Gujarat (south), only (Fig. 4). This has a very similar distribution range recorded in another endemic colubrid snake, *Psammophis longifrons* (Vyas and Patel 2013).

**Conservation status:** *Coronella brachyura* is legally protected as a Schedule IV species under the Indian Wildlife Protection Act of 1972 and categorized as Least Concern by the IUCN Red List of Threatened Species (Srinivasulu et al. 2013). During the study no specific threats to the species were observed, except the general threats to the reptilian fauna as reported by Vyas (2007), including expansion of urbanization, agricultural lands, habitat loss, and habitat alteration, and large numbers of snakes killed by laymen due to fear.

**Taxonomy:** The genus *Coronella* has shown to be paraphyletic based on molecular data from western Palaearct-
ic species by recent workers (Pyron et al. 2010, 2013; Utiger et al. 2002). Recently, Hoser (2012) removed Coronella brachyura from the genus Coronella and allocated it to the genus Wallophis; it was earlier suggested by Werner (1929). In doing so, Hoser (2012) did not provide any valid taxonomic characters to support partitioning the genus Coronella. Coronella brachyura differs from its congeners by the higher number of scale rows at mid body (23 vs. 21 in C. gironica and 19 in C. australiaca); by the higher number of supralabials (8–9 vs. 7 in C. australiaca and 8 in C. gironica). However, the status of Indian taxa remains unresolved as there is no comparative study on the morphology or molecular data of Coronella with other colubrid genera. We believe for now, the Indian species should be considered as a member of the genus Coronella. Future studies involving detailed comparison of the genus Coronella, with the aid of molecular techniques, will be essential for the correct allocation of Indian species.

Acknowledgments.—We are thankful to Bhautik Dudhatra and Bhavin Mistri for sharing information and allowing us to examine the snake specimens. Rahul Khot (BNHS) kindly facilitated examining material under his care. Vithoba Hegde, Priya Warekar, Pinal Patel, and Saunak Pal provided valuable assistance at the BNHS, Mumbai. Viral Mistry and Frank Tillack provided some important literature. Zeeshan Mirza and Deepak Veerappan are thanked for valuable comments for which the manuscript benefited. HP was supported by a INSPIRE Fellowship (IF 130480) from the Department of Science and Technology (DST), New Delhi, India.

Literature Cited


Boulenger GA. 1890. The Fauna of British India, including Ceylon and Burma (Reptilia and Batrachia). Taylor and Francis, London, United Kingdom. 541 p.


Boulenger GA. 1890. The Fauna of British India, including Ceylon and Burma (Reptilia and Batrachia). Taylor and Francis, London, United Kingdom. 541 p.


Kamble R. 2010. First record of the Indian Smooth Snake (Coronella brachyura) from Latur, Maharashtra, India. Available: https://www.academia.edu/3037435/First_record_of_the_Indian_Smooth_Snake_Corono-
nella brachyura from Latur, Maharashtra, India [Accessed: 15 April 2015].


Harshil Patel is a young herpetologist, currently pursuing a Ph.D. in the Department of Biosciences, Veer Narmad South Gujarat University, Surat, India. He is interested in the systematics and distribution of colubrid snakes and geckos of genus Hemidactylus from India. His doctoral work and study is on the “Taxonomic study of herpetofauna of Northern Western Ghats of Gujarat State.”

Raju Vyas is an enthusiastic herpetologist, presently working at the Sayaji Baug Zoo, Vadodara-Gujarat, India as a Zoo Biologist. After his post graduate education in Zoology, he pursued a doctorate in philosophy, his research dissertation titled “Snakes of Gujarat State,” from Bhavnagar University, Gujarat-India (1995). For almost two decades, he has extensively explored the natural heritage of Gujarat state and its territorial extensions contributing significantly toward the enrichment of base line data on amphibian and reptiles of the state. Apart from his exposure to ex-situ conservation, he’s active in breeding many native reptilian species. Presently, his activities include conservation of urban wildlife, especially Mugger Crocodiles, and has an affiliation with the Vishwamitri River Project, Vadodara Municipal Corporation, Vadodara. Raju has been monitoring the urban crocodile population in Gujarat and has published several reports about the same. Lastly, Raju is optimistically promoting mitigation measures for man-animal conflicts locally and nationally.

Shantilal K. Tank is a Professor at the Department of Biosciences, Veer Narmad South Gujarat University, Surat. For the past two decades Dr. Tank has worked in the fields of environmental toxicology, bioremediation, and ichthyology. Recently, he works in biodiversity documentation and conservation.