



New locality records of *Rhacophorus lateralis* Boulenger, 1883 (Amphibia: Anura: Rhacophoridae), in Western Ghats, India

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Rhacophorus lateralis was described by Boulenger (1883) based on a single specimen (BM 82.2.10.75) from "Malabar" deposited at the British Museum. No further collections were available until Daniel Bennet and his team's rediscovery of the species from Coorg (Das 2000), Karnataka (ZSI A9071 and ZSI A9072). Das (2000) also removed the species from provisional synonymy with *Rhacophorus malabaricus* proposed by Wolf (1936).

Biju (2000) stated that Anil Zacariya (the fourth author of this account) located this species in 1980 from Kalpetta, Wyanad, Kerala and that subsequently in 1981 S.D. Biju observed 28 individuals of *R. lateralis* from Kalpetta. This species of tree frog was considered to be very rare, documented from Wyanad (Biju 2000) and Periyar Tiger Reserve (Easa 2003; Daniels 2005). In 2004, the

IUCN assessed this species as Endangered and considered its range to be restricted to two small areas of Wyanad and Coorg in southern Western Ghats of India (Biju et al. 2004). Recently Biju (2009) and Goel & Goel (2010) reported natural history studies in this species. Molur & Molur (2010) reported this species from Shanthi Estate, Coorg.

On 04 March 1995, the second author observed a transforming young one (metamorph) of this species from the Shola forest patches of Eravikulam National Park, Kerala (10°12'56"N & 77°02'14"E). On 13 April 2005, during a survey in Wyanad, Kerala, the fourth author collected two specimens of the species from a coffee plantation at Kalpetta (11°34'57"N & 75°59'34"E; ZSI/WGFRS/V/A 627a & b). On 12 August 2006, the first author located five individuals of this species and collected one of them from a coffee plantation at Bygoor, (13°18'59"N & 75°36'58"E) (V/A 667) Chikkamagaluru, Karnataka and on 14 August 2007 the first author saw four individuals and collected one representative specimen from Balehonnur (13°18'03"N & 75°27'01"E; V/A 678; Image 1a); both the localities are adjacent to Bhadra Tiger Reserve, Karnataka. On 25 July 2008 the third author located a few individuals of the species from a coffee plantation at Haramakki Estate, Kalasa (13°18'02"N & 75°21'10"E; Image 1b), adjacent to the Kudremukh National Park, Karnataka. However, no specimens were collected.

We determined the identity of the four individuals collected (Table 1) as *R. lateralis* based on the following diagnostic features assigned to the taxon by Boulenger (1890) and Das (2000): habitus slender; head short, broader than long; snout short, obtusely pointed, projecting beyond mouth; canthus rostralis distinct; loreal region slightly concave; vomerine teeth in two small oblique series between the choanae; nostrils nearer to the tip of the snout than to the eye; interorbital space broader than the upper eyelid; eyes large; tympanum half the diameter of the eye; a supratympanic fold distinct; fingers and toes with enlarged disc possessing circummarginal grooves; fingers and toes with dermal fringes and more than half webbed; subarticular tubercles not very prominent; a fold of the skin bordering the forelimb anteriorly (Image 2); tibiotarsal articulation reaching the tip of the snout; dorsum smooth, belly granular; a prominent dorsolateral yellow streak on each side from the nostril to the groin along the outer edge of the upper eyelid.

A wide range of colour variation was noticed in the specimens collected and in individuals observed in the field (Image 1a and 1b). Both Boulenger (1890) and Das (2000) do not mention the variations in colour pattern in the species. Colour changes in this species are well recorded by Bennet et al. (2000), they attributed colour

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Image 1. *Rhacophorus lateralis*. A - with brown dorsum; B - with green dorsum



Image 2. Showing the prominent spurs on forelimb and hindlimb (indicated by arrows).



Image 3. Post-metamorphic tadpole of *R. lateralis*

change to stress and Molur & Molur (2010) found that the frequency and rapidity of colour change reduced after the individuals were handled repeatedly.

We noticed two colour morphs within the species, one morph with a dominantly green dorsum and the other with a brown dorsum with a mixture of varying shades of green. Our field observations confirmed that individuals of the species tend to change their body colour from time to time. Individuals with the green dorsum have the green colour interspersed with fine sky blue spots; a distinct metallic yellow lateral stripe running from the eye to the groin; a clear sky blue coloured line bordering either side of the yellow stripe; hind arm, lateral sides and ventral sides of the thigh with fleshy red to dark red colouration; fore arm and dorsal surface of the hind legs striped with broad green and narrow blue bands. The individuals with brown dorsum have darker brown spots; no demarcating blue line bordering the yellow stripe from the eye to the

groin; entire hind arm, lateral sides and ventral sides of the thigh, transparent; fore arm and dorsal surface of the hind legs striped with broad yellowish-green to brownish-green and narrow dark brown or black bands. Notably, the one individual collected and the few individuals sighted in the field had the prominent spur in front of the joint of the hind arm and the forearm. We observed a post-metamorphic froglet (Image 3), which was green in colour with black spots over the dorsum and along the sides of the body having only the limbs barred without any distinctive dorsolateral yellow streak from the nostril to the groin along the outer edge of the upper eyelid.

In Wyanad, Bhadra Tiger Reserve and Kudremukh National Park, we noticed *R. lateralis* in association with *R. malabaricus* in the coffee plantations. Interestingly Molur & Molur (2010) and Goel & Goel (2010) noted the association of this species with *R. malabaricus* in Coorg area of coffee plantation and organic spice farm

Table 1. Morphometric data of *Rhacophorus lateralis*.

	ZSI A9071*	ZSI A9072*	# V/A 627a	# V/A 627b	# V/A 667	# V/A 678	Average ± standard deviation (range)
Snout-vent length	29.5	32.0	28.0	29.0	30.4	31.4	30.1 ± 1.51 (28.0 – 32.0)
Axilla-groin distance	14.1	18.0	15.0	14.4	15.0	14.6	15.2 ± 1.42 (14.1 – 18.0)
Head Length	8.1	8.3	8.2	9.0	8.4	9.2	8.5 ± 0.45 (8.1 – 9.2)
Head Width	9.0	9.6	9.8	10.0	10.0	10.2	9.8 ± 0.43 (9.0 – 10.2)
Head Depth	5.6	5.3	6.2	7.0	7.0	6.4	6.3 ± 0.70 (5.3 – 7.0)
Eye Diameter	5.1	4.1	4.8	5.0	5.2	5.0	4.9 ± 0.40 (4.1 – 5.2)
Upper eyelid width	2.2	2.2	3.0	2.6	3.0	3.0	2.7 ± 0.39 (2.2 – 3.0)
Interorbital distance	3.5	5.8	4.2	4.0	4.2	4.2	4.3 ± 0.78 (3.5 – 5.8)
Internarial distance	2.8	2.5	3.0	3.4	3.0	2.4	2.9 ± 0.37 (2.5 – 3.4)
Eye-snout-tip distance	4.0	4.4	4.2	4.6	4.2	4.0	4.2 ± 0.23 (4.0 – 4.6)
Eye-nostril distance	2.3	2.5	3.4	3.4	3.0	3.0	2.9 ± 0.45 (2.3 -3.4)
Eye-tympanum distance	0.6	0.7	1.0	1.0	0.6	0.4	0.7 ± 0.24 (0.6 – 1.0)
Tibia length	13.6	17.8	15.4	16.2	17.0	17.2	16.2 ± 1.52 (13.6 – 17.2)
Disc diameter finger III	1.5	1.5	1.4	2.0	2.0	1.6	1.7 ± 0.27 (1.4 – 2.0)
Horizontal tympanum diameter	1.5	1.6	1.8	2.0	1.4	1.4	1.6 ± 0.24 (1.4 – 2.0)
Vertical tympanum diameter	1.6	2.0	2.0	2.2	1.6	1.6	1.8 ± 0.27 (1.6 – 2.2)

* - from Das (2000); # - ZSI/WGRC/V/A (Zoological Survey of India/Western Ghat Regional Centre/Vertebrata/Amphibia)

Table 2. Collection/sight localities of *Rhacophorus lateralis* in the Western Ghats

Collection localities	Latitude (N)	Longitude (E)	Date/Year of sighting	Source/ Year of publication
Karnataka				
Bhadra Wildlife Sanctuary, Chikkamagaluru District	13°18'	75° 27'	12 August 2006	present report
Kudremukh National Park, Chikkamagaluru District	13°11'	75°21'	25 July 2008	present report
Mojo Plantation, Coorg District	12°28'	75°42'	2007-2009	Goel & Goel 2010
Shanthi Estate, Coorg District	12°24'	75°44'	May 2005	Molur & Molur 2010
Luckunda Estate, Coorg District	12°03'	76°02'	1998	Bennet et al. 2000; Das 2000
Kerala				
Kalpetta, Wyanad District	11°34'	75°59'	1997 & April 2005	Biju 2000 and present report
Eravikulam National Park, Idukki District	10°12'	77°02'	4 March 1995	present report
Thekkady, Idukki District	9°35'	77°12'	Not available	Easa 2003
Periyar, Idduki District	9°31'	77°15'	1990	Biju 2000; Daniels 2005

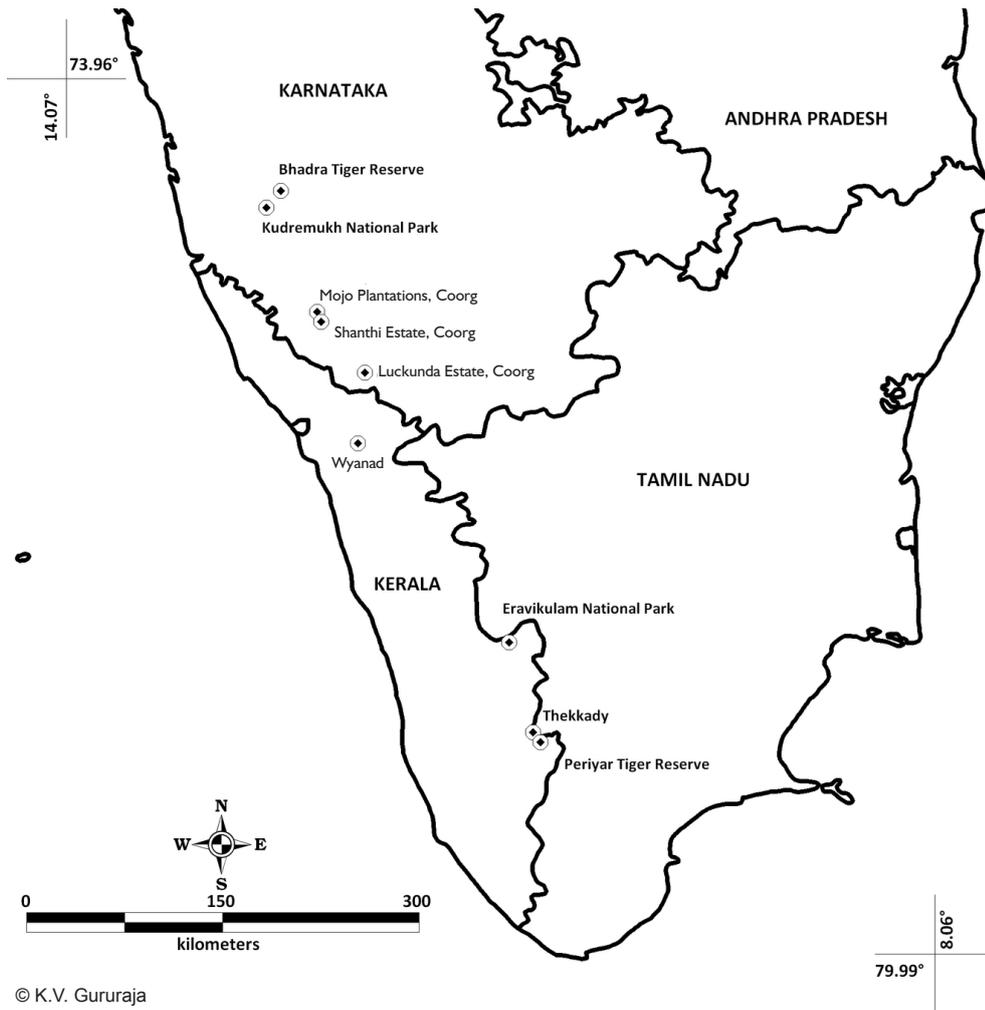
respectively. The species is being reported here for the first time from the surroundings of Bhadra Tiger Reserve and Kudremukh National Park, earlier record being Coorg in the central Western Ghats. Our report extends the range of the species further about 75km (aerial distance) towards the north from Mojo Plantations, Coorg (Goel & Goel 2010) in the Western Ghats. It appears that the species probably has wider distribution than what was known to us so far in the Western Ghats (Fig. 1).

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Figure 1. Map showing the locations where *Rhacophorus lateralis* has been recorded in Western Ghats

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