

Western Ghats Bronzeback

Predation of *Raorchestes tinniens* by *Ahaetulla perroteti* in Nilgiris, Tamil Nadu, India



IUCN Red List:

Global –
Endangered
B1ab(iii) ver 3.1

Regional –
Endemic to
Western Ghats –
Peninsular India -
(Srinivasulu et al.
2014)

Ahaetulla perroteti (female) preying on *Raorchestes tinniens* in Emerald.

Reptilia
[Class of Reptiles]

Squamata
[Order of Scaled reptiles]

Colubridae
[Family of Snakes]

Ahaetulla perroteti
[Western Ghats
bronzeback]

Species described by
(Duméril, Bibron &
Duméril) in 1854

Anurans have a key role in the food web of our ecosystem, acting either as important predators or significant preys and linking terrestrial to aquatic ecosystems (Wilbur 1997; Whiles et al. 2006). Snakes are the main predators of anurans in habitats which are surrounded by water bodies (Wells 2007; Bernarde & Abe 2010). Some snakes prey almost exclusively on amphibians, which contribute up to 90% of their diets. However, detailed observations of predation events of consuming frogs are rare due to the difficulties of monitoring these animals in the wild (Malkmus 2000; Lima & Colombo 2008). So far no studies are available on the predation of *Raorchestes tinniens* which are endemic to the Western Ghats.



The vine snakes are mildly venomous and the venom is able to paralyse the prey. They have a slender body, smooth-scaled and pointed snout, diurnal, mostly arboreal and viviparous (Whitaker & Captain 2004). Dorsal side bright green in colour, ventral side yellowish or pale green in colour. The *A. perroteti* (Dumeril et al. 1854) is endemic to the Western Ghats mountain range of Southern India, with precise distribution records from North Canara (Jerdon 1854), Nilgiris (Theobald 1868; Wall 1919; Kannan & Bhupathy 1996), silent Valley (Balakrishnan 2007), High Wavys (Hutton 1949; Hutton & David 2009), Periyar Tiger Reserve (Zacharias 1997), Kalakkad-Mundanthurai Tiger Reserve (Kumar et al. 2001; Ishwar et al. 2001). Wall (1919) and Kannan & Bhupathy (1996) remark that the species is common on the grassy hills of Nilgiris likewise, the *Raorchestes tinniens* is also have restricted distribution in Nilgiris and endemic to this region. It is a small adult sized bush frog (Male SVL 20.5 ± 1.8 mm, Female SVL 26.8 ± 1.6 mm, N=3; Biju & Bossuyt, 2009). Here, we report the predation on *R. tinniens* by the Western Ghats Bronzeback *A. perroteti*. We measured Snout-vent length (SVL) and tail length (TL) with an inch tape (LC=1mm). The number of ventral scales and subcaudals was counted according to Dowling (1951). We determined sex of snakes on presence of hemipenis and colouration using keys (Ganesh & Chandramouli 2011).

Global Distribution :

India (Kerala, Tamil Nadu)

Predation of *R. tinniens* was recorded near Emerald Valley ($11^{\circ}19.20'N$ & $76^{\circ}37.13'E$; elevation 1,975m), which is covered by different types of vegetation such as, shola forest, grassland, wattle plantation etc. We observed an adult female *Ahaetulla perroteti* (brownish in colour, ventrals 154 and subcaudal 60, SVL 484mm and TL 112mm) preying on *R. tinniens* on 19 May 2015, at 13:39hr. Likewise preying by *A. perroteti* on the endemic frog was recorded in Mukurthi National Park ($11^{\circ}16.23'N$ & $76^{\circ}31.45'E$; elevation 2,200–2,250 m), Nilgiri District, Tamil Nadu. We observed a male *A. perroteti* (greenish yellow in colour, ventrals 140 and subcaudal 79, SVL 414mm and TL 153mm) preying on *R. tinniens* in grassland on 24 May 2015 at 14:23hr. The *R. tinniens* was captured by *A. perroteti* by a rapid strike to the middle of its body, slightly closer to the forelimbs. During the first three minutes, the anuran moved its limbs vigorously in an attempt to escape from the snake. The snake then began to ingest the anuran by the head, together with the left front limb, swallowing the animal as far as the scapular girdle, when it stopped for five minutes, until the prey had become completely motionless. The snake swallowed the rest of the frog using rhythmic movements of its mandible. It took more than 10 minutes to swallow.

Predation is one of the greatest causes of mortality in anuran's natural populations and can occur at any stage (Zug et al. 2001). Wall (1919) reported that *A. perroteti* (formerly *Dryophis perroteti*) feeds on frogs and lizards from their staple diet and he also reported that species of *Ixalus* had been previously recorded in its diet (the genus *Ixalus*



***Ahaetulla perroteti* (male) preying on *Raorchestes tinniens* in Mukurthi National Park. (a) *A. perroteti* locating the head after immobilization of *R. tinniens*; (b) swallowing upper half of the body**

was changed to *Philautus* by Bossuyt & Dubois (2001), then the genus name *Philautus* was also changed into *Raorchestes* (Biju *et al.* 2010). From the present observation, it was confirmed that *R. tinniens* (formerly genus: *Ixalus*) may be one of the important diet of *A. perroteti* in Nilgiris.

The reason for choosing the *R. tinniens* as a main diet by *A. perroteti* may be because of its smaller size, easy to swallow and wide distribution pattern of this endemic frog throughout the Nilgiris. Moreover, this frog have the tendency even calls during the daytime, mainly from earthen bank or grasslands for the purpose of advertising itself for the breeding purposes (Biju & Bossuyt 2009). Therefore, predation events are more likely to occur, and consequently its observation, being able to improve the understanding of the predator-prey relationship and its ecological process. Recent reports stated that, the *R. tinniens* is becoming an endangered species (Dinesh *et al.* 2013) due to several anthropogenic activities. Moreover, we report that, natural predation is also a major threatening factor for the decline of this endemic frog in Nilgiris. The natural predation cannot be avoided by us, but manmade disturbances to this frog can be restricted to improve the population level of this endemic frog in Nilgiris.

Predation is one of the greatest causes of mortality in anuran's natural populations

Acknowledgements: Corresponding author would like to thank DST/ INSPIRE Fellowship, Government of India, New Delhi for providing funds. We are deeply grateful to Mr. Halan (Forest Range Officer), Mr. Sivakumar (Forester) Mukurthi National Park, Dr. B. Ramakrishnan (Assistant Professor) and Dr. J. Ebanaser (Head) Department of Zoology and Wildlife Biology, GAC, Ooty for their help and support. Mr. R. Chandran and Mr. M. Muthukrishnan (APW, Mukurthi National Park) for accompanying us during field work. Corresponding author hearty thanks to family and friends for their encouragements.



References

- Balakrishnan, P. (2007).** Reptiles of Muthikulam Reserved Forest, Kerala. *Cobra* 1(4): 22-29.
- Bernarde, P.S. & A.S. Abe (2010).** Habitats alimentares de serpentes em Espigão do Oeste, Rondonia, Brasil. *Biota Neotropica* 10 (1): 167-173.
- Biju, S.D., Yogeshshouche, A. Dubois, S.K. Dutta & F. Bossuyt (2010).** A ground – dwelling Rhacophorid frog from the Highest Mountain Peak of the Western Ghats of India. *Current science* 98: 8-25.
- Biju, S.D. & F. Bossuyt (2009).** Systematic and phylogeny of *Philautus* Gistel, 1848 (Anura: Rhacophoridae) in the Western Ghats of India with Description of 12 new species. *Zoological Journal of Linnean society* 155: 374-444.
- Bossuyt, F. & A. Dubois (2001).** A review of the frog Genus *Philautus* Gistel, 1848 (Amphibia: Anura, Ranidae, Rhacophoridae). *Zyelanica* 6: 1-112.
- Dinesh, K.P., C. Radhakrishnan, K.V. Gururaja, K. Deuti & G.K. Bhatta (2013).** A Checklist of Amphibia of India with IUCN Red List Status, Updated till April 2013 (Online Version). pp 18. at http://zsi.gov.in/checklist/Amphibia_final.pdf (online only).
- Dowling, H.G. (1951).** A proposed standard system of counting ventrals in snakes. *British Journal of Herpetology* 1: 97-99.
- Dumeril, A.M.C., G. Bibron & A.H.A. Dumeril (1854).** *Erpetologie Generale ou Histoire Naturelle Complete des Reptiles. Tome Septieme. Deuxieme Partie, Comprenant l'histoire des Serpents Venimeux.* Paris: Librairie Encyclopédique de Roret: i-xii + 781-1536.
- Ganesh, S.R. & S.R. Chandramouli (2011).** On the nomenclature and taxonomy of the south Indian colubrid snake *Ahaetulla perroteti* (Duméril, Bibron and Duméril, 1854). *Herpetological Bulletin* 117: 19-24.
- Hutton, A.F. (1949).** Notes on the Snakes and Mammals of the High Wavy Mountains, Madura District, South India. Part-I, Snakes. *Journal of Bombay Natural History Society* 48 (3): 454-460.
- Hutton, A.F. & P. David "2008" (2009).** Notes on a collection of Snakes from South India, with emphasis on the snake fauna of Meghamalai Hills (High Wavy Mountains). *Journal of Bombay Natural History Society* 105 (3): 299-316.
- Ishwar, N.M., R. Chellam & A. Kumar (2001).** Distribution of forest floor reptiles in rainforest of Kalakkad-Mundanthurai Tiger Reserve, South India. *Current science* 80 (3): 413-418.
- Jerdon, T.C. "1853" (1854).** Catalogue of the Reptiles inhabiting the Peninsula of India. *Journal of the Asiatic Society of Bengal* 22: 522-534
- Kannan, P. & S. Bhupathy (1996).** Breeding season of horse-shoe pit viper (*Trimeresurus strigatus*) in Nilgiri Biosphere Reserve. *Journal of Bombay Natural History Society* 93: 592.
- Kumar, A., R. Chellam, B.C. Chowdry, D. Mudappa, K.Vasudevan, N.M. Ishwar & B. Noon (2001).** Impact of Rainforest Fragmentation on small Mammals and Herpetofauna in the Western Ghats, South India. U.S.F.W.S, Wildlife Institute of India and Salim Ali Centre for Ornithology and Natural History, India, 28 pp.
- Lima, A.F.B. & P. Colombo (2008).** Observação do comportamento predatório de *Liophis miliaris orinus* (Serpentes, Colubridae) em *Hylodes meridionalis* (Anura, Hylodidae), Serra Geral, Rio Grande do Sul, Brasil. *Revista Brasileira de Zoocien* 10 (1): 73-76.
- Malkmus, R. (2000).** Nutrition and foraging. In: Amphibians: the world of frogs, toads, salamanders and newts. In: Hofrichter R ed. Augsburg, Firefly Books. 264 pp.
- Srinivasulu, C., B. Srinivasulu & S. Molur (Compilers) (2014).** *The Status and Distribution of Reptiles in the Western Ghats, India.* Conservation Assessment and Management Plan (CAMP). Wildlife Information Liasion Development Society, Coimbatore, Tamil Nadu, 148Pp
- Theobald, W. (1868).** Catalogue of Reptiles in the Museum of Asiatic Society of Bengal. *Journal of the Asiatic Society of Bengal* 37: 7-88.
- Wall, F. (1919).** Notes on a collection of snakes made in the Nilgiri Hills and the adjacent Wynaad. *Journal of Bombay Natural History Society* 26: 552-584.
- Wells, K.D. (2007).** The ecology and behavior of amphibians. The University of Chicago Press, Chicago.
- Whitaker, R. & A. Captain (2004).** *Snakes of India the Field Guide.* Draco Books, Chengelpat, Chennai. 481 pp.
- Whiles, M.R., K.R. Lips, C.M. Pringle, S.S. Kilham, R.J. Bixby, R. Brenes, S.Connelly, J.C. Colon-Gaud, M. Huntbrown, A.D. Huryn, Y.C. Montgomer & S. Peterson (2006).** The effects of amphibian population declines on the structure and function of Neotropical stream Ecosystems. *Frontiers in Ecology and Environment* 4: 27-34.
- Wilbur, H.M. (1997).** Experimental Ecology of Food Webs: Complex systems in Temporary Ponds. *Ecology* 78(8): 2279-2302.
- Zacharias, V.J. (1997).** Reptiles of Periyar Tiger Reserve, Kerala. *Journal of Bombay Natural History Society* 94 (3): 575-579.
- Zug, G.R., L.J. Vitt & J.P. Caldwell (2001).** *Herpetology: An Introductory Biology of Amphibians and Reptiles.* 2nd ed. Academic Press, San Diego. 275-98.

J. Leona Princy¹, P. Kannan², P.Santhosh Kumar³ & A. Samson⁴

¹⁻³ Herpetology and Tribal Medicine, ⁴Mammalogy and Forest Ecology, Department of Zoology and Wildlife Biology, Government Arts Collage, Udhagamandalam, Tamil Nadu 643002, India.
Email: 'leonaprincymc@gmail.com (corresponding author)

Citation: Leona Princy et.al. (2017). Predation of *Raorchestes tinniens* by *Ahaetulla perroteti* in Nilgiris, Tamil Nadu, India. Newsletter of Reptile Rap, #169 In: *Zoo's Print* 32(4): 15-18.