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REPORT OF SOME NOTEWORTHY SPECIMENS AND SPECIES OF HERPETOFAUNA FROM SOUTH-EAST INDIA

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Abstract
We report abnormal individuals of *Ramanella variegata*, *Lycodon aulicus* (sensu lato), *Bungarus caeruleus* which exhibited variation from the 'typical morphs' of their respective species. Also we report a rarely recorded species *Polypedates* cf. *leucomystax* (from south India), from the Mannampandal area of Tamil Nadu. These observations based on voucher photographs are presented for the first time.

Keywords: Morph, aberration, variation, phenotypic plasticity, polymorphism

Introduction

The Coromandel Coast of India was one of the first areas in south Asia where herpetological investigations began, dating back to Russell (1796, 1801). Several species have their type localities in 'Tranquebar' (now Tarangambadi), Pondicherry, 'Madras' (now Chennai) and 'Vizagapatam' (now Vishakapatnam), located in this part of India. The herpetofauna of Mannampandal village (11°09'N 079°68'E; 19 m a.s.l.) in Mayiladuthurai Taluk, Nagapattinam District, ca. 28 km west off the historical place Tranquebar has been briefly discussed (Kannan *et al.*, 1994; Ganesh & Chandramouli, 2007). In this paper we report on certain unique specimens and species of herpetofauna from this area, which are noteworthy in terms of some of their hitherto unknown natural history traits.

Materials and Methods

These observations were made by random and/or opportunistic sightings between July 2006 and November 2008 in and around Anbanadhapuram Vahaira Charity (A.V.C) College campus. Animals seen were diagnosed, measured and photographed in-situ using Canon Powershot A640 and Canon EOS 400D model cameras. Values of a character presented for more than one individual are separated by a comma. Altitude was determined by

Garmin 12 channel Global Positioning System readings taken at the locality. Syntopic conspecifics observed were also used for comparison, in addition to published keys, so as to determine any possible patterns of geographically correlated variance if present. However we omitted all data that did not deviate from literature, unless strongly needed, as a backup for species identity.

Observations and Discussion

***Ramanella variegata* (Stoliczka, 1872)**

An adult (Fig.1) sighted on 23/10/07 on tar road, during a rainy night. Dorsum plain grayish brown all over without any visible markings or patterns; supraocular area bluish, labials and gular bluish grey, dorsal parts of fore and hindlimbs pale white, with islets of dark grayish brown, best visible in femur and humerus; venter pinkish white, iris and pupil black and indistinguishable.

The usual colouration of this species, which is the only *Ramanella* distributed in the southern Indian plains; is olive brown above, finely marbled with yellow or cream, underside white, sometimes marked with brown on the throat and sides (Biju, 2001; Daniels, 2005; Dutta, 1997; Dutta & Manamendra-Arachchi, 1996). The specific epithet '*variegata*' and its common English name 'marbled' narrow mouthed frog are indicative of the variegated / marbled pattern of its dorsum. Uniform grey colouration in this species is hitherto unreported in the literature.

Fig. 1: *Ramanella variegata*

***Polypedates* cf. *leucomystax* (Gravenhorst, 1829)**

Two adults (Fig. 2) sighted on 29/10/07 and 28/9/08 on shrubs at night. Dorsum yellowish brown with four darker stripes extending from postnasal, the inner two stripes being paravertebral and the outer two being dorsolateral, the outer and the inner stripes converge at the supraocular region, from where they divide posteriorly to pass through the temporal area and extend to the cloaca, the outer stripes being broadest at mid-torso, exactly at the articulation of the hindlimb with the trunk; postocular region bluish, infralabial and gular surfaces off-white, limbs dorsally cross-barred with darker shades, best visible on the proximal elements of the limbs; venter pinkish white, iris golden brown, pupil horizontal; snout-vent length 20.0, 50.0; axilla-groin distance: 8.3, 20.7; head length 9.0, 22.6; head width 7.0, 17.6; snout length 3.0, 7.6; eye diameter 1.3, 3.3; tympanum diameter 1.3, 3.3; internarial distance 1.9, 4.7; interorbital distance 3.0, 7.5.

We observed several *Polypedates maculatus* (Gray, 1834) that matched the descriptions in literature (Dutta, 1997; Dutta & Manamendra-Arachchi, 1996) but these two individuals are certainly not *P. maculatus* as there is no dorsally 'striped' pattern present in *P. maculatus*, whose specific epithet means 'spotted' (Dutta & Manamendra-Arachchi, 1996). Dutta (1997) stated that *P. leucomystax* is widely distributed in most parts of Southeast Asia and different colour morphs led to the erection of subspecies from different geographic localities. It differs from its closely allied congener *P. maculatus* by an osteological character 'parieto-squamosal arch bone' which is evident at normal resting posture in *P. lecomystax* but not in *P. maculatus* (Daniel, 2002; Daniels, 2005; Dutta, 1997).

Dutta (1997) remarked that some earlier authors considered *P. maculatus* and *leucomystax* to be subspecies and the occurrence of *P. leucomystax* in Sri Lanka is erroneous and in Karnataka, south India is doubtful. The report from the Western Ghats of Karnataka was once considered authentic and then 'changed' to doubtful (Daniels, 1997, 2000 & 2005). Biju (2001) and Daniel (2002) deny its presence in south India. Banerjee & Deuti (2006) give its English name as 'four-lined' tree frog (vs. 'six-lined' tree frog fide Daniels, 2005), which is consistent with its former, specific epithet '*quadrilineata*' [(sensu Boie, 1835) see Dutta, 1997].

Soud & Das (2005) state *P. leucomystax* to be common in low lands and urban areas with water and prolific vegetation, in the Bongaigon District of Assam State. Hussain *et al*. (1999) mention its distribution in Northeast India up to an elevation of 300 m asl. Deuti (1997) reports a range extension of this species from Sikkim, West Bengal, Assam,

Meghalaya, Arunachal Pradesh, Manipur and also curiously from Gujarat and Madhya Pradesh. Rao *et al*. (2005) mentions its occurrence in Nallamalai hills, a part of the Eastern Ghats of Andhra Pradesh in south India, with photographic evidence. Given this scenario, it can no longer be considered as a mesic forest habitat specialist, but is rather a eurytopic species occurring in plains and anthropogenic habitats as well. Since *P. leucomystax* in itself is a species-complex containing sympatric morphotypes (Narins *et al*., 1998), we refer our specimens to *Polypedates* cf. *leucomystax*, based on evident parietosquamosal arch bone visible at rest and the 'striped' dorsum.

Fig. 02: *Polypedates* cf. *leucomystax*

***Lycodon aulicus* (Linnaeus, 1758) sensu lato**

Table 1: Comparison of meristic, morphologic and metric characters between 'typical' and 'aberrant' morphs of syntopic adult males of *Lycodon aulicus* from Mannampandal.

No	Characters	Morph 1	Morph 2
1	Scalerows (smooth)	17:17:15	17:17:15
2	Apical pits	towards centre of tip	towards upside of tip
3	Supralabials (those touching eye)	9 (3,4,5)	9, 11 (3,4,5)
4	Infralabials (those touching genials)	9 (6,7)	9, 10 (5)
5	Loreal (horizontally elongate)	1	1
6	Temporal	2+3	2+2
7	Preocular	1	1
8	Postocular	2	2
9	Preventrals	3	3
10	Linguals	5	4
11	Ventrals (strongly angulate laterally)	218	199
12	Anals	2	2
13	Subcaudals (divided) + terminal scale	68 pairs +1	68 pairs + 1
14	Nuchal mark	inverted V shape	V shape
15	Band structure	parallel	diverging
16	Band pattern	patterned interiorly	plain interiorly
17	Band extent	visible dorsally only	visible laterally also
18	Head length	21.3	25
19	Snout length	7	3.3
20	Head width (maximum)	13	14.5
21	Head width (eye level)	10.3	11
22	Neck width	10.6	10.6
23	Eye diameter	3.6	1.3
24	Loreal length	3	2.5
25	Lower eye margin–lip distance	2	1.3
26	Inter orbital distance	5.9	3.3
27	Position of first band (respect to ventrals)	9	0
28	Scales between parietal and first band	11	2
29	Head length: snout length	3.04	7.37

30	Head length: maximum head width	1.63	1.72
31	Max. head width: neck width	1.22	1.36
32	Head width (eye level): neck width	0.97	1.03
33	Eye diameter: lower eye margin-lip distance	1.8	1
34	Loreal length: eye diameter	1.2	1.92
35	Snout length: Interorbital distance	1.18	1

An adult male, (Figs. 3 & 4) one each of the two morphs, on tarred road and brick pile (respectively), at night. Comparison of characters 2, 14-17 and 27-35 in the above table reveals considerable differences in cephalic morphometry, general habitus and colouration between these two morphs. There is no literature report about this phenomenon (Sharma, 2003; Smith, 1943; Whitaker, 1978; Whitaker & Captain, 2004), except Daniel (2002) who gives drawings [from Wall] of its various colour morphs. Smith (1943) in his line drawings, Daniel (2002), Whitaker & Captain (2004) and Goonewardene *et al*. (2006) in their photographs depict morph 1 with thick head and first band in inverted-V shape just behind parietals (i.e., on the head and well before the neck). Das (2002) Das & de Silva (2005) and Whitaker (1978) depict morph 2, with the first band in V shape, well off the parietals, but near the neck. Rao *et al*. (2005) from Nallamalai hills depict morph 2 as *L. aulicus* and morph 1 (incorrectly) as *L. travancoricus*, which apart from our record, are another proof for syntopy between these two morphs. Though morph 2 superficially resembles *L. osmanhilli* (Taylor, 1950) of Sri Lanka, it differs from the latter by the character preocular contacting frontal (vs. not in contact, in *L. osmanhilli*) (de Silva, 1980). Therefore, we doubt that the *Lycodon aulicus* s. lat. complex is yet taxonomically unresolved. We have given the differences between merely a single representative from each of the two morphs, but this is evident enough to distinguish them. In the live individual of morph 1, we counted 218 ventrals excluding preventrals (vs. < 214 in Smith, 1943; Whitaker & Captain, 2004) which imply that literature defining this species cannot be considered as fully comprehensive. Considering the variations shown herein and the rich, subjective synonyms originating from places far and wide, we strongly suggest that more detailed studies needed to be undertaken to resolve the taxonomy of *L. aulicus* (sensu lato). Similar works involving subtle variation in colouration and morphometry led to the resurrection of *Dendrophis chairecacos* Boie, 1827 and *Dipsas schokari* Kuhl, 1820 from the synonymy of *Dendrelaphis tristis* (Daudin, 1803) sensu Smith (1943) (see Van Rooijen & Vogel, 2008 & '2009' 2010).

Fig. 3: *Lycodon aulicus* morph 1

Fig. 4: *Lycodon* cf. *aulicus* morph 2

***Bungarus caeruleus* (Schneider, 1802)**

An adult (Fig. 5), dead individual measuring 780 mm observed at night on 23/8/07 on a tarred road during a rainy night. Dorsally grayish black without any white cross bands and was without even a speck of white on the dorsum; supralabials, penultimate costals and venter white. Scalerows (smooth) 15:15:15; ventrals (not angulate laterally) 202; subcaudals (undivided) 40; anal 1; supralabials (touching eye) 7 (3, 4); preocular 1; postoculars 2; temporals 1+2.

Scalation of our individual agrees with literature (Russell, 1796; Whitaker & Captain, 2004) accounts of *Bungarus caeruleus*. It is certainly not *B. niger* Wall, 1908 as the distribution records are well off the mark and *B. niger* has higher ventral

and subcaudal counts (ventrals: 216–231; subcaudals: 47-57) than *B. caeruleus*, (see Smith, 1943; Whitaker & Captain, 2004).

Fig. 5: *Bungarus caeruleus*

The aberrant individual was not observed to be in the cycle of ecdysis, which can render body patterns unclear (Whitaker & Captain, 2004). It was an adult, 780 mm long, which is noteworthy here as young snakes are known to have much more intense patterns than adults, as seen in *Eryx johnii*, *Macrophisthodon plumbicolor*, *Argyrogena fasciolatus*, *Ophiophagus hannah* and *Bungarus caeruleus* (see Smith, 1943; Whitaker & Captain, 2004). Full grown individuals of this species are known to become dull gray in colour without any banded pattern (Anslem de Silva pers. comm., March, 2010). The total length of our individual was 780 mm, which is close to the average length (1000 mm) and is nowhere near the maximum length (1750 mm) (Whitaker & Captain, 2004). Moreover, *B. caeruleus* exhibits a peculiar phenomenon of colour variation with respect to geography. In India, the south-west coast and the south-east coast populations of *B. caeruleus* differ in colouration, with the west coast kraits being more evidently banded than those of the east (Das, 2002). All conspecifics (both adults and juveniles) observed from the present area, were typically banded (pers. obs.). Dravidamani *et al*. (2006) examined up to 200 individuals, but failed to record any aberrations. Kuch (1991), Whitaker (1969) and Vogel & Chanhome (2006) report of banded snakes like *Bungarus fasciatus* and *Boiga dendrophila melanota* exhibiting aberrant pattern, notably stripes instead of the usual banded pattern (see Whitaker & Captain, 2004; Smith, 1943; Vogel & Chanhome, 2006). Kuch (1991) stated that he provisionally preferred to regard longitudinally striped aberrant snakes to be individual mutations rather than a geographically correlated phenotype. While Whitaker (1969) commented that the female and all six juveniles were striped, with just two bands on the tail and in scalation they did not differ from *Bungarus fasciatus*. Vogel & Chanhome (2006) remarked that such phenomenon of parent and offspring exhibiting similar, consistent variation was associated with low incubation temperatures or a dominant recessive genetic disposition. Since we observed only one individual with this sort of aberration, we are presently unable to comment on the reason for the same.

Remarks

Our observations indicate the lacuna present in the herpetological community of this highly anthropogenic, non-forested alluvial plains country, which is no more than a matrix of plantations and rivulets, despite the fact that many of the species reported here are widespread in the country and are often encountered in the wild. Phenotypic plasticity has been a very interesting and often highly influential factor in contributing to polymorphism. Prince *et al*. (2003) state that "genotype + environment + random variation → phenotype", which are aberrant individuals that differ from normal conspecifics in any noticeable way including morphology, physiology and behaviour. Very little published information is available on phenotypic plasticity in Indian herpetofauna.

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