

Taxonomic Notes Concerning the Trionychid Turtle *Lissemys punctata* (LACEPÈDE)

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Abstract. Although long-conceived as a monotypic species of three subspecies (SMITH, 1931), intergradation has not yet been demonstrated between subspecies of *Lissemys punctata*. The two subspecies *L. p. punctata* and *L. p. andersoni* show intergradation in pattern features of head and carapace, and are similar in osteological features. The configuration of peripheral bones, and advent of well developed plastral callosities at a relatively small size that indicates small maximal size, suggest specific status for *L. p. scutata*.

Introduction

The currently recognized concept of three subspecies of *Lissemys punctata* stems from SMITH (1931). His interpretation, however, seemingly based on a subjective impression of overall similarity, lacks detailed documentation of intergradation. Based on my examination of specimens of *L. punctata*, features of pattern and similarity in certain osteological features tend to support a subspecific relationship between *L. p. punctata* and *L. p. andersoni*, whereas osteological features suggest specific status for *L. p. scutata*. WEBB (1980) recently recognized the two Indian subspecies as *L. p. punctata* (= *L. p. gramosa*, auct.) and *L. p. andersoni* (= *L. p. punctata*, auct.).

Intergradation

Pattern. Features of pattern on the head-neck and carapace of some specimens indicate intergradation between *Lissemys punctata punctata* and *L. p. andersoni*. *Lissemys p. punctata*, with the dark-striped head pattern and mostly uniform brownish carapace, occurs in peninsular India, primarily south of the Ganges River basin, and in Sri Lanka. *Lissemys p. andersoni*, having the yellow blotched head and carapace, occurs generally in Pakistan, northern India, Bangladesh, and northwest coastal Burma, primarily within the Indus and Ganges-Brahmaputra river basins (map. Fig. 1).

The juvenile head patterns of both subspecies may be obscured or reduced in large adults, seemingly less so in *L. p. andersoni*. The pattern in *L. p. punctata* consists of narrow, dark brown stripes on a pale brown background (illustrations in ANNANDALE, 1912: PL. VI, fig. 3, and in DERANIYAGALA, 1939:295, fig. 111); some stripes may be variously re-

duced (fragmented, shorter) in some small specimens (FMNH 73920). In *L. p. andersoni*, with pale yellow blotches on the head and neck (illustrations in PRITCHARD, 1979: 602 [colored], 608), some blotches may be coalesced to form two broad yellow stripes on side of head (ZSI 290). Patterns judged to be intergradient are dark-striped but with pale blotching between the stripes.

The carapace pattern of both young and adult *L. p. punctata* is mostly uniform brown but may have scattered, small dark markings. In *L. p. andersoni* the carapace pattern of indistinctly dark-margined pale yellow spots and blotches (PRITCHARD, 1979: 602 [colored], 608) may be mostly uniform olive-brown in large adults (that retain yellow spotting on head; ZSI 21476 from Varanasi, Uttar Pradesh, and live turtles observed by me

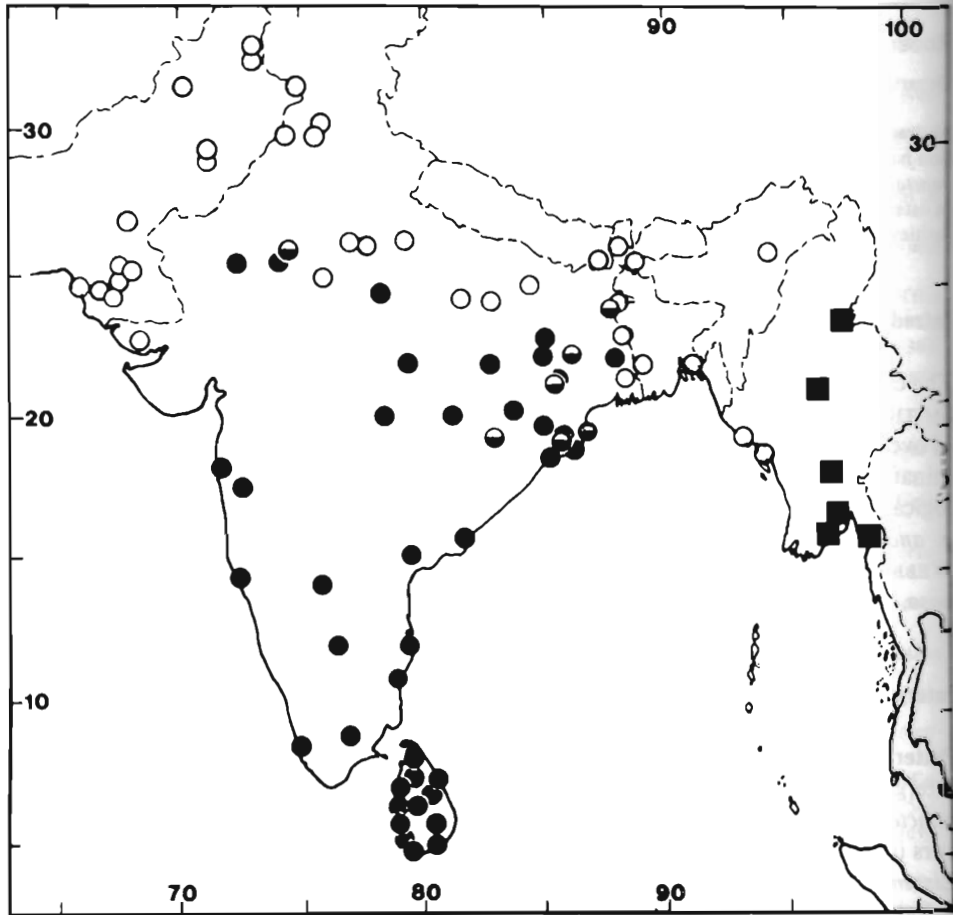


Fig. 1. Map of Indian subregion showing distribution of *Lissemys* (*L. punctata punctata*, solid circles; *L. p. andersoni*, open circles; *L. p. punctata* X *L. p. andersoni* intergrades, half solid-open circles; *L. scutata*, squares). Specific localities for intergrades and some other specimens are indicated in text; others (literature records, museum specimens) are available from author.

in Calcutta market). A colored illustration reproduced by GRAY (1834 [1830–1835]: Pl. 64) depicts a uniform olive-green carapace with reduced yellow markings on the head (Fatehgarh on Ganges River, Uttar Pradesh). Peter C. H. PRITCHARD (pers. comm.) observed live *Lissemys* from Bharatpur (Ganges drainage basin in northeastern Rajasthan) “that ranged from prominently spotted to totally unspotted.” An intergradient carapace pattern seems to have developed with the enlargement and slight darkening of the yellow spots and blotches to form a brownish, pale-blotched, coarse reticulation. ANNANDALE’s concept of *Emyda granosa intermedia* (with dark head striping), in which he mentions the carapace “with obscure paler markings” and “pale spots” (1912: 172, 174), seems to correspond, in part at least, to what is here interpreted as an intergradient carapace pattern.

Impressive as an intergrade between *Lissemys punctata punctata* and *L. p. andersoni* is an individual (freshly preserved when examined) from near Bhubaneswar, Orissa (ZSI 22745) that combines head-neck and carapace patterns of the two subspecies, but more closely resembles *L. p. punctata* than *L. p. andersoni*. The head-neck pattern consists of prominent, rather broad, dark stripes with intervening pale blotches; the carapace has a fairly contrasting dark brown and buff blotched pattern. A hatchling (ZSI 258) from the state of Bihar (Singhbhum District) has dark head striping with very indistinct pale yellow areas between the stripes, and a pale blotched, dark reticulated carapace pattern. Specimens, otherwise resembling *L. p. punctata*, that suggest intergradation in having only pale blotches of varying distinctness on the carapace are one from Sambhar Lake, Rajasthan (ZSI 21151), two from near Chandwa, Bihar (ZSI 23482, N = 2), one from Dhamra, Orissa (ZSI 12568), and two of four from near Mahakhand, Orissa (ZSI 22709, N = 4). Finally, the holotype of the taxon *intermedia* (ANNANDALE, 1912, ZSI 16764) conforms to *L. p. punctata*, but seems to have two indistinct pale, paravertebral blotches on the neck between the dark stripes. Localities of these specimens judged to be intergrades are so indicated on the distribution map (Fig. 1). More precise evaluation of these pattern features and geographic extent of intergradation remains to be elaborated by future investigators.

Individuals of both subspecies of *Lissemys punctata* occur in the Hooghli River drainage, West Bengal. Most specimens in the Hooghli drainage conform to the subspecies *L. p. andersoni* in all features of pattern, where some may have mostly continuous broad yellow stripes (ZSI 290, Calcutta, and live specimens observed in Calcutta market). ACHARJI (1955: 388), however, reported *L. p. punctata* (he mentioned carapace without any markings and head with black streaks) in the Hooghli drainage from Barakar, Burdwan District, West Bengal. Specimens of *Lissemys* examined by me from the state of Orissa are most like *L. p. punctata* (some seem to be intergrades) but ROMULUS WITAKER (pers. comm.) informs me that captive yellow-spotted *Lissemys* at his facility in Madras are from Orissa. Intergradation (specimens from states of West Bengal, Bihar, Orissa, and Rajasthan, Fig. 1) seems to occur in the southern tributaries of the Ganges River and in the Mahanadi River basins. However, *Lissemys punctata* is probably less confined to river drainage systems than other trionychid turtles owing to its preference for ponds and lakes and habit of overland, nocturnal forays.

Osteological Features. The close resemblance in osteological features is not incongruous with intergradation of *Lissemys punctata punctata* and *L. p. andersoni*. Ontogenetic

variation is manifest in increasing size of plastral callosities (DERANIYAGALA, 1939: 301, fig. 114), and in fusion and reduction in number of peripheral bones (HASAN, 1941: 238). ANNANDALE (1912) and SMITH (1931) mention the relative size of the entoplastral callosity that varies geographically, smallest in the north (*L. p. andersoni*); these authors also comment on the relative numbers of the peripheral bones of the carapace and the enlarged first (anteriormost) peripheral that do not vary geographically. ANNANDALE (1912) also notes that the xiphiplastral "callosities are never in contact for the whole of their length" in the northern subspecies (*L. p. andersoni*) as occurs in turtles to the south.

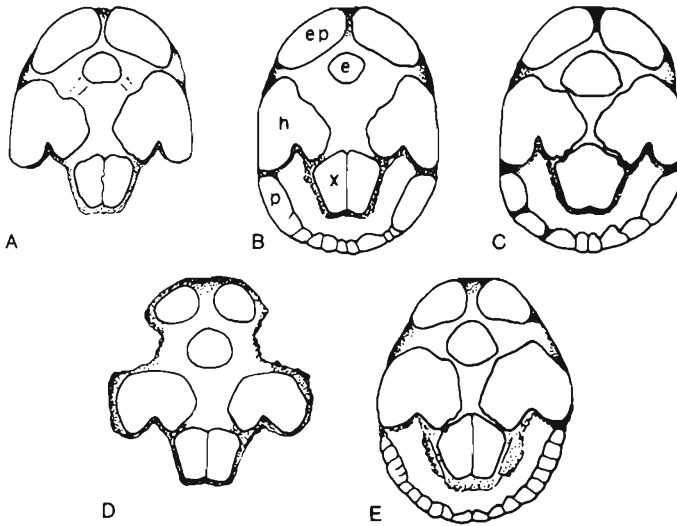


Fig. 2. Ventral views showing outline of plastral callosities (sculpturing not shown) and (B, C, E) carapacial peripheral bones — e, entoplastron; ep, epiplastra; h, fused hyo-hyoplastra; x, xiphiplastron; p, peripherals. Top row (A, B, C), *Lissemys punctata*: A, *L. p. andersoni*, ZSI 1714, Calcutta, West Bengal, India, bony plastron 205 mm long; B, *L. p. punctata*, ZSI 17044, Cuttack, Orissa, India, bony plastron 235 mm (hyohyoplastra not fully developed); C, *L. p. punctata*, BMNH 2067–1972, Sri Lanka, bony plastron 271 mm (xiphiplastron fused, no medial suture). Bottom row (D, E), *Lissemys scutata*: D, ZSI 1709, Mandalay, Burma, bony plastron 120 mm (plastral callosities not fully developed); E, ZSI 1708, Bhamo, Burma, bony plastron 140 mm.

Large specimens of both subspecies are similar in having the xiphiplastral callosities broadly sutured medially, and in having few peripheral bones with the first enlarged; however, the first peripheral bone may be variable in size (Fig. 2B, C), and the number of peripheral bones may be different on either side of the same carapace. The maximal size of the entoplastral callosity may be smaller in *L. p. andersoni* than in *L. p. punctata*, but further data is needed. The largest bony plastron of *L. p. andersoni* examined by me, only 205 mm in length, has an entoplastral callosity of moderate size (ZSI 1714, Calcutta, Fig. 2A), whereas the largest bony plastron of *L. p. punctata*, 271 mm long, has a large callosity (BMNH 2067–1972, Sri Lanka, Fig. 2C). Larger specimens of *L. p. ander-*

soni may have larger callosities. However, the other callosities of both of these plastra are large and well developed (suggesting near maximal size and that *L. p. andersoni* may be smaller than *L. p. punctata*); in contrast, the shape of the fused hyo-hypoplastra of a bony plastron of 235 mm (ZSI 17044, Cuttack, Orissa; intergrading area but specimens most like *L. p. punctata*) indicates incomplete development (Fig. 2B, compare with A and C).

Status of Lissemys punctata scutata

The Burmese subspecies *Lissemys punctata scutata* is distinctive in regard to certain osteological features when compared to the other two subspecies of *L. punctata*. In the largest specimens peripheral bones, mostly subequal in size, are generally smaller and more numerous in *L. p. scutata* (SMITH, 1931, fig. 34) than in the other two subspecies. The maximal size of the entoplastral callosity is large (Fig. 2E), about the same relative size as that in *L. p. punctata* (Fig. 2C). However, the plastral callosities in *L. p. scutata* are large and well developed at a bony plastral length at least as small as 140 mm (ZSI 1708, Fig. 2E), and xiphiplastral callosities are broadly sutured on plastra as small as 120 mm (ZSI 1709, but other callosities not fully developed, Fig. 2D). In this general size range the plastral callosities in *L. p. punctata* and *L. p. andersoni* have not attained maximal size. This precocious development of plastral callosities should indicate that the maximal size of *L. p. scutata* is smaller than that of the other two subspecies. Also, the maximal size of the paired epiplastral callosities of *L. p. scutata* may not be as large as that attained in the other two subspecies (see comparison in Fig. 2). The largest specimen examined of *L. p. scutata* (BMNH 88, 12, 3, 4) is a dry shell (carapace-plastron) with a maximal plastral length of 185 (bony plastron, 170) mm, which roughly corresponds to a maximal carapace length, including prenuchal and peripherals, of approximately 220–230 mm (along curvature). THEOBALD (1876: 32) makes the statement “8 inches or more” and BOURRET (1941: 230) mentions a length of 230 mm in regard to maximal size of *L. p. scutata*. So far as known the two Indian subspecies attain maximal sizes larger than *L. p. scutata*; *L. p. andersoni* may be smaller (maximal carapace length 285 mm; MERTENS, 1969: 21, Pakistan) than *L. p. punctata* (370 mm; DERANIYAGALA, 1939: 305, Sri Lanka).

The geographic range of *Lissemys punctata scutata* is confined to the drainage basins of the Irrawaddy, Sittang, and Salween rivers in Burma (Fig. 1), which corresponds to that of *Trionyx formosus*. The head (usually with only a slightly darkened postocular stripe) and carapace are mostly uniform brown in young and adults. The nearest records of occurrence are for *L. p. andersoni* in coastal northwest Burma (Akyab [= Sittwe] and Jergo Island [= Sagu Kyun] off Arakan coast; ANNANDALE, 1912: 176, ZSI). There are no specimens indicating intergradation with *L. p. scutata*. Furthermore, an imposing physiographic barrier, the north-south trending Arakan Mountains and to the north the Chin Hills, mostly separates the lowland habitats of central Burma from those of coastal western Burma.

The small maximal size and nature of the peripheral bones, in conjunction with the geographic-physiographic relationships, suggest specific status, *Lissemys scutata*, comb. nov.

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