

Intergradation Between *Melanochelys trijuga trijuga* and *M. t. coronata*
(Testudines: Emydidae: Batagurinae)

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The Indian Black Turtle or *pe amai*, *Melanochelys trijuga*, is one of the most abundant chelonians in the Indian subcontinent, with a distribution extending from Sri Lanka (Deraniyagala 1939), through India and Burma, to western Thailand (Wirot 1979), although apparently excluding Bangladesh (Das, 1989). Nevertheless, details of the distribution of the seven described subspecies remain obscure. The range maps provided by Smith (1931), Das (1985), and Tikader and Sharma (1985) indicate rather clearly allopatric distributions for the Indian subspecies, but the overall range of the species is based on extremely few and widely-separated locality points (except for Sri Lanka and Kerala), as is evident in the map provided by Iverson (1986). Deraniyagala (1939) recognized two subspecies in Sri Lanka, but the geographic separation, if any, between these two forms was not made clear.

Of the various subspecies, the most distinctive is probably *Melanochelys trijuga coronata*, whose distribution is restricted to the state of Kerala in southwestern India (the distribution map provided by Tikader and Sharma (1985) involves a transposition of the range of *coronata* and *trijuga*). *M. t. coronata* has a striking head pattern, with a broad, black diamond-shaped marking on the crown of the head, contrasting with the white to yellow temporal region. The head pattern of the other subspecies consists at most of small, yellow to pink spots and reticulations that may disappear with age. The shell as a whole is usually unrelieved black, in contrast to other subspecies in which at least a lighter plastral rim is evident (although Deraniyagala (1939)

reported completely black specimens of *M. t. trijuga* from Kalpitiya, Sri Lanka and we have seen increased pigmentation with age in the north Indian subspecies, *indopeninsularis*, in which adult animals may lose the lighter plastral rim). The distribution of *M. t. coronata* is generally indicated as widely separated from that of *M. t. trijuga* by the Western Ghats, but the southward penetration of the *forma typica* into the hiatus between these two subspecies is not represented on existing range maps, and the subspecific relationship between these two forms has been assumed rather than demonstrated. We here report upon four specimens that bridge the geographic map between *M. t. trijuga* and *M. t. coronata*, and three that show characters intergradient between them.

An adult male (CL 23.9 cm; CW 16.4 cm) was collected by the two authors from a dry stream bed in Chichli, Indira Gandhi (formerly Annamalai) Wildlife Sanctuary, Coimbatore District, Tamil Nadu, on March 27, 1989 (Fig. 1). The right anterior margin of the shell showed signs of an old injury, with several peripheral bones lost. The head pattern of the specimen included the diamond-shaped marking typical of *Melanochelys trijuga coronata*. The yellow head reticulations and the yellow plastral margin is suggestive of *M. t. trijuga*, and the size of the specimen is greater than that of any recorded specimen of *M. t. coronata* (maximum 17.5 cm (Smith 1931) or 18 cm (Tikader and Sharma 1985) of 20.8 cm (Das 1985)). The specimen was retained alive and housed at the Madras Crocodile Bank.

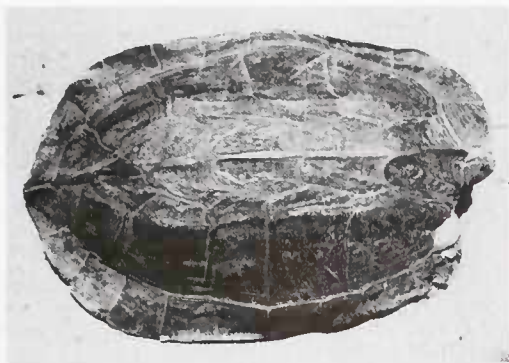


FIG. 1. Intergrade between *Melanochelys trijuga coronata* and *M. t. trijuga*.

A second specimen—a fragmentary shell only—was also found in the Indira Gandhi Wildlife Sanctuary, in a tribal settlement. The nuchal area and anterior peripherals are missing. Shell width is 13.7 cm, again indicating a specimen larger than is typical of *Melanochelys trijuga coronata*. Ankylosis of the shell, as illustrated for Sri Lanka specimens by Deraniyagala (1939), is essentially complete, except for faint indications of the peripheral sutures. The specimen is registered as PCHP 2803 in the private collection of the second author.

In addition to these, two intergradient specimens were found in the collection of the Southern Regional Station of the Zoological Survey of India (Madras), both collected by M. Vasant and party. An 8.1 cm juvenile (Lot no. 10) was collected at Kombiar Charagam, Kalakkadu Wildlife Sanctuary, Turunelveli District, Tamil Nadu (altitude 210 m), on October 13, 1987. A 20.6 cm adult male (Lot no. 6) was collected at Nambiar, Nambi Kovil Road, also within Kalakkadu Wildlife Sanctuary (altitude 140 m), on January 11, 1987.

Melanochelys trijuga is basically a pond turtle, and the Western Ghats appear to separate the essentially lowland ranges of *M. t. coronata* and *M. t. trijuga*. Nevertheless, the new localities all fall within upland areas actually in the Western Ghats. It appears that the hills may form a sufficient barrier to allow the evolution of

different subspecies east and west of the Ghats, but the ability of *M. trijuga* to exist far from water suggests that individuals wandering into these hills may provide the stock for an intergradient population. It would be worthwhile to search for a lowland intergradient population in the coastal area at the northern extreme of the distribution of *M. t. coronata*.

Other cases exist of congeneric batagurine species of a similar ecological role differing primarily in head pattern, as is the case with some of the species of *Rhinoclemmys* in the Neotropics. One is tempted to interpret the different markings as a means of avoiding cross-matings in situations of sympatry. But, the overall allopatry of the species of *Rhinoclemmys* in northern South America, for example, suggests that this interpretation may be an incomplete one, as does the discovery of intergradation between adjacent populations of *Melanochelys* that differ primarily in cephalic pigmentation.

Literature Cited

- DAS, I. 1985. Indian turtles. A field guide. World Wildlife Fund India, Eastern Region, Calcutta.
- DAS, I. 1989. Report on a survey of freshwater turtles and land tortoises in Bangladesh. Report to Fauna and Flora Preservation Society, July 1989. Mimeo 9 pp.
- DERANIYAGALA, P. E. P. 1939. The tetrapod reptiles of Ceylon. Colombo Museum, Colombo. 412 pp.
- IVERSON, J. B. 1986. A checklist with distribution maps of the turtles of the world. Paust Printing, Richmond, Indiana. 283 pp.
- SMITH, M. A. 1931. The fauna of British India, including Ceylon and Burma. Reptilia and Amphibia, Vol. 1. Loricata, Testudines. Taylor and Francis, London. 185 pp.
- TIKADER, B. K. AND R. C. SHARMA. 1985. Handbook: Indian Testudines. Zoological Survey of India, Calcutta.
- WIROT, N. 1979. The turtles of Thailand. Mitbhadung Press, Bangkok.