

**PHYLOGENETIC RELATIONSHIPS AMONG THE  
ASIAN TORTOISES OF THE GENUS *INDOTESTUDO*  
(REPTILIA: TESTUDINES: TESTUDINIDAE)**

John B. Iverson<sup>1</sup>, Phillip Q. Spinks<sup>2</sup>, H. Bradley Shaffer<sup>2</sup>,  
William P. McCord<sup>3</sup> and Indraneil Das<sup>4</sup>

<sup>1</sup>Dept. of Biology, Earlham College, Richmond, Indiana 47374 USA.  
Email: johni@earlham.edu

<sup>2</sup>Section of Evolution and Ecology, University of California, One Shields Avenue,  
Davis, California 95616 USA.

Emails: pqspinks@ucdavis.edu; hbshaffer@ucdavis.edu

<sup>3</sup>East Fishkill Animal Hospital, Hopewell Junction, New York 12533 USA.  
Email: chelodina@aol.com

<sup>4</sup>Centre for Herpetology, Madras Crocodile Bank Trust, Post Bag 4,  
Mamallapuram 603 104, Tamil Nadu, India, and  
Institute of Biodiversity and Environmental Conservation,  
Universiti Malaysia Sarawak, 94300, Kota Samarahan, Sarawak, Malaysia  
Email: idas@ibec.unimas.my  
(with two text-figures)

**ABSTRACT.**— Based on variation in 1094 bp of the mitochondrial cytochrome *b* gene among members of the genus *Indotestudo* from southern Asia (*I. elongata*), south-western India (*I. travancorica*), and eastern Indonesia (*I. forstenii*), *I. travancorica* is most similar genetically to *I. elongata* (3.7% divergence), and strongly divergent from *I. forstenii* (5.5 to 5.9%). Individuals of *I. forstenii* with and without a nuchal scute differ genetically at less than 0.7%. Our analysis offers no support for the hypothesis that Indonesian populations of *I. forstenii* represent introductions of *I. travancorica* from India. The recognition of three nominal species (*I. elongata*, *I. forstenii* and *I. travancorica*) in the genus is thus warranted.

**KEY WORDS.**— *Indotestudo*, *I. elongata*, *I. forstenii*, *I. travancorica*, turtle, systematics, DNA.

**INTRODUCTION**

Schlegel and Müller (1840: 30) first described *Testudo forstenii* from Halmahera Island, in the Molucca Islands (now Maluku) in eastern Indonesia and it is now known only from the islands of Halmahera and Sulawesi. Although Schlegel and Müller did not explicitly designate a type specimen, Hoogmoed and Crumly (1984) determined that the description was based on a specimen (RMNH 3811) in the Rijksmuseum van Natuurlijke Historie (at present Nationaal Natuurhistorisch Museum) in Leiden. Blyth (1853: 639) described *Testudo elongata* from “Arakan” (= Rakhine Yoma, a mountain range along coordinates ca. 18-21° N, 93-95° E) in western Myanmar (Burma), apparently based on four syntypes (ZSI 796, 798, 799, and 800) in the

collection of the Zoological Survey of India in Calcutta (Das et al., 1998). Fifty-four years later, Boulenger (1907:560; pl. I-II) described *Testudo travancorica* from the Western Ghats of south-western India, based on two specimens in the British Museum (Natural History) (now, The Natural History Museum, London, BMNH 1906.7.18.6-7).

Lindholm (1929) first recognized the distinctiveness of *Testudo elongata* and designated it as the type species of his new subgenus *Indotestudo* (genus *Testudo*), but he did not mention the placement of the other two species. However, Williams (1952) supported the recognition of the subgenus *Indotestudo* (under *Testudo*), and included *elongata*, *forstenii*, and *travancorica* therein. Williams (p. 220 in Loveridge and Wil-