

***Rafetus leloii* HÀ DÌNH DỨC, 2000 – an invalid species of softshell turtle from Hoan Kiem Lake, Hanoi, Vietnam (Reptilia, Testudines, Trionychidae)**

BALÁZS FARKAS¹ & ROBERT G. WEBB²

¹ Balázs Farkas, Bercsényi u. 21, 2464 Gyúró, Hungary. E-mail: farkasbalazs@yahoo.com

² Robert G. Webb, Department of Biological Sciences, University of Texas at El Paso, El Paso, Texas 79968–0519, USA. E-mail: rgwebb@utep.edu

Abstract. Nomenclatural information concerning the large, well-publicized softshell turtles in Hoan Kiem Lake, central Hanoi, Vietnam is discussed. In 2000 HÀ DÌNH DỨC formally described these turtles as *Rafetus leloii*. Comparison of descriptive features of *R. leloii* with those of *R. swinhoei*, previously reported from northern Vietnam (including Hanoi), forces the conclusion that the two taxa are synonymous.

Kurzfassung. *Rafetus leloii* HÀ DÌNH DỨC, 2000 – ein ungültiger Artname einer Weichschildkröte aus dem Hoan Kiem See, Hanoi, Vietnam (Reptilia, Testudines, Trionychidae). – Die Nomenklatur einer großen, gut bekannten Weichschildkröte aus dem Hoan Kiem See in Hanoi, Vietnam, wird diskutiert. 2000 beschrieb HÀ DÌNH DỨC die Schildkröte formal als *Rafetus leloii*. Ein Vergleich der beschriebenen Merkmale von *R. leloii* mit denen von *R. swinhoei*, bekannt aus dem Norden Vietnams (einschließlich Hanoi), lässt den Schluss zu, dass beide Taxa identisch sind.

Key words. Nomenclature, softshell turtles, *Rafetus leloii*, northern Vietnam.

1. Introduction

The large trionychid turtles living in Hoan Kiem Lake (= Ho Guom) in central Hanoi, Vietnam have been the subject of a number of publications. Their identity has varied, either as *Trionyx* (= *Amyda*) *cartilagineus* (PETZOLD 1963: 12, but questionably), *Pelochelys bibroni* (= *P. cantorii*, see WEBB “2002”[2003]) by several authors (noted in FARKAS & ZIEGLER “2002”[2003]: 151) and as listed in the 1992 Vietnam Red Data Book (HÀ DÌNH DỨC 2000b), or as *Rafetus swinhoei*. NIEKISCH *et al.* (1997) discussed these softshells, dismissing their identity as *A. cartilaginea* (based on snout shape, p. 29) and implicating either *Pelochelys* or *R. swinhoei*, and suggested the possibility of very old *R. swinhoei* (FARKAS 1998: 29). HENDRIE (2000) employed only *Rafetus* sp., and PRITCHARD (2001: 12–15) as *R. swinhoei* updated information about maximal size, distribution in Vietnam, and distinction from *Pelochelys*.

These softshell turtles have been long-monitored by HÀ DÌNH DỨC (Faculty of Biology, University of Science, Vietnam National University of Hanoi). He provided information about them in two unpublished reports (1993, 1994 [not seen]), and in regarding them as representing a new species initially intended to use the name *hoguomensis*, but later chose *Rafetus hoankiemensis* as the official name (JOHN IVERSON in litt. to WEBB; information excerpted from The Vietnam Investment Review, Copyright 2000 World Sources Online, Inc., A Joint Venture of FDCH, Inc. and World Times, Inc.).

Two new scientific names proposed by two different authors appeared (one each) in two different Hanoi newspapers: *Pelochelys hoguomensis* S.Á. (1999), and *Rafetus leloii* HÀ DÌNH DỨC (2000a). One of us (WEBB) thanks KRAIG ADLER for sending copies of the appropriate pages of these newspapers. The newspaper texts in Vietnamese have not been transcribed into

English to determine unequivocal nomenclatural availability. The Code (ICZN 1999) stipulates that the work "must be issued for the purpose of providing a public and permanent scientific record" [Art. 8.1.1.]; certainly these works were a public record, but perhaps not intended to be permanent or scientific. Names published after 1930 must be accompanied by a statement "purported to differentiate the taxon" [Art. 13.1.1.]; this provision was presumably satisfied by at least an indication of large size. If the names are proposed conditionally after 1960, which may have been the intent, they are not available [Art. 15.1.], but specifics are unknown from the untranslated Vietnamese text. Names published after 1950 with anonymous authorship are not available [Art. 14] and if the author "cannot be determined ... then the name ... is ... anonymous" [Art. 50.1.1.]; the author of the new *Pelochelys*, indicated only by the initials S.Á., is here considered anonymous. Names published after 1999 must be accompanied by the "explicit fixation of a holotype, or syntypes" [Art. 16.4.1.]; thus, seemingly devoid of type material, *Rafetus leloii* (2000a) is an unoccupied name. In sum, these two new names are regarded as nomina nuda and nomenclaturally unavailable.

However, HÀ DINH DÚC (2000b) formally introduced (occupied) the name *Rafetus leloii* for the trionychid turtles living in Hoan Kiem Lake. PRITCHARD (2001: 13) remarked that the "validity ... [of *R. leloii*] ... remains very much in question". The purpose of this report is to compare descriptive features of *R. leloii* and *R. swinhoei* in an attempt to determine the taxonomic status of *R. leloii*.

2. Material and Methods

Rafetus leloii is compared only with *R. swinhoei*. Features distinguishing the genera *Pelochelys* and *Rafetus* are in MEYLAN (1987), FARKAS & FRITZ (1998), and PRITCHARD (2001). FARKAS (1992) commented on comparative differences between *R. swinhoei* and *Pelodiscus sinensis*. Information and illustrations in the original description of *R. leloii*, supplemented by an English translation, correspondence and photographs kindly supplied by HÀ DINH DÚC himself (to FARKAS, courtesy THOMAS ZIEGLER) were the basis for comparison with osteological and fluid-preserved material of *R. swinhoei* already listed in FARKAS & FRITZ (1998). Our endeavors have been necessarily aided by a German translation (courtesy UWE FRITZ) of the original description in Vietnamese of *R. leloii*. Museum codes for cited specimens include BMNH, The Natural History Museum, London; NMW, Naturhistorisches Museum, Vienna; PCHP, Chelonian Research Institute (formerly personal collection of P.C.H. Pritchard), Oviedo; and ZMB, Zoologisches Museum der Humboldt-Universität, Berlin. The abbreviation "RHK" attributed to the type series of *R. leloii* by HÀ DINH DÚC (2000b) stands for "Rua Hoan Kiem" (i.e. Hoan Kiem Lake softshell turtle), and thus does not refer to an effective registration number.

3. Description of *Rafetus leloii*

HÀ DINH DÚC (2000b) designated three type specimens of *Rafetus leloii*, the holotype (RHK 01–1967), an allotype (RHK 02–1968), and a paratype (RHK 03–1993). The text includes a general description, three tables, eight colour illustrations (pp. 107–108), and a brief English summary (no descriptive information). Tables 1 and 2 provide measurements (mm) of the three "types" of *R. leloii*, including skulls of the allotype and paratype; Table 3 offers a comparison of two skull and two bony carapace features of *R. leloii* with those of *R. swinhoei*, *Pelochelys "bibroni"*, *Pelodiscus sinensis*, *Palea steindachneri*, and *Amyda cartilaginea*.

3.1 Type Material

The holotype (RHK 01–1967) is the stuffed specimen exhibited and enclosed in a glass case in Ngoc Son Temple on the larger of two islands in Hoan Kiem Lake. It has been photographed by several authors (CONSTABLE 1982: 252 [Fig.]; NIEKISCH *et al.* 1997: 30, Fig. 2, colour; RUDOLPHI & WESER 1998: 5, 6, Figs. 3, 4; GUYOT 1999: 9 [Fig.]; PRITCHARD 2001: 14, Fig. 6, colour). Found dead along the shore of the lake in 1967 (GUYOT 1999: 8), it was

prepared for display in 1967–1968; CONSTABLE (1982: 252, reiterated in DAS 1991: 67; as *Pelochelys*) referred to the holotype “that emerged from the water in 1926 allegedly weighing 550lbs [247.5kg] and 5 1/2feet long [167.64cm]”, NIEKISCH *et al.* (1997) and PRITCHARD (2001), respectively, estimated the carapace about 99cm or 965mm long, and 70cm or 711mm wide. PRITCHARD (2001: 14) noted the bony carapace ca. 635mm long, and the tail not extending beyond the carapace (= female?); however, the holotype is noted as stuffed male in the English translation of the original description, and the male sex is verified by an appropriately angled photograph (kindly made available to us by THOMAS ZIEGLER), that depicts the large, curved tail extending beyond the carapace. HÀ DINH DỨC (2000b) recorded the carapace length as 640mm and width 580mm in Table 1 (580mm repeated in Table 2 as carapace disc); these dimensions are judged to refer to the bony carapace.

The allotype (RHK 02–1968) is a skeleton of a large female from Hoan Kiem Lake in the Hanoi Museum. CONSTABLE (1982: 252) seemingly referred to this specimen as an “immense turtle skeleton” at “Quoc Tu Giam, the first place of higher education in Hanoi”. The partly articulated skeleton is illustrated (side and ventral views) in GUYOT (1999: 10 [2 unnumbered figs. only, no text discussion]). GUYOT’s ventral view illustration depicts an incorrectly assembled skeleton with irregularly arranged plastral bones covering a dorsal view carapace; PRITCHARD (2001: 14) also noted “some curious errors in placement of certain bones”, and estimated the bony carapace length as about 600mm. A bony carapace length of 545mm and width of 510mm are listed in Table 1 in HÀ DINH DỨC (2000b). Skull measurements of the allotype (Table 1) include a maximal length of 236mm and width of 150mm, and basicranial length of 160mm; the skull is illustrated in dorsal view (HÀ DINH DỨC 2000b: Fig. 2 [an included metric scale suggests a skull width of about 160mm]; = Fig. 4 [left hand specimen] of the English translation).

The paratype (RHK 03–1993) is a stuffed specimen with the skull removed in the Hoa Binh Museum from Quynh Lam Swamp near the town of Hoa Binh (ca. 60 air km ESE Hanoi). It seems to be the 1993-obtained, mounted specimen on exhibit in the municipal museum in Hoa Binh that was discussed and photographed by PRITCHARD (2001: 14, Fig. 7, colour); he noted the specimen as larger than the holotype with a maximal (curvature) carapace length of 1095mm and bony disc length of 633mm, maximal (straight-line) carapace width of 740mm, and a straight head width of 170mm, and a total skull length of 250mm. Measurements of the paratype in Table 1 (HÀ DINH DỨC 2000b) include bony carapace length of 605mm (probably straight-line) and width of 585mm (repeated in Table 2 as carapace disc), and a maximal carapace width (Table 2) of 875mm; the corrected (using included metric scale in illustration) maximal skull length of about 250 (instead of 234) mm and width of 170 (instead of 147) mm agree with PRITCHARD’s straight head width of 170mm and total skull length of 250mm. The basicranial length of the skull is about 180mm. The skull of the paratype is illustrated in ventral view (HÀ DINH DỨC 2000b, Fig. 3; = Fig. 4 [right hand specimen] of the English translation).

3.2 Description

The following generalized descriptive comments (HÀ DINH DỨC 2000b: 108), not indicated as applicable to any one specimen, are an amalgam of both the English and German translations that are inconsistent in detail.

The head is rather large, the eyes not protuberant, and the muzzle is blunt. The upper jaw sheath is ivory-white in the premaxillary region that extends somewhat beyond the lower jaw. The upper lip covers the upper jaw and half of the lower jaw. The round eyes have distinct eyelids. The large head cannot be withdrawn. The skull is similar to *Rafetus* (= *R. swinhoei*) but “kleiner” (smaller or narrower) than in *Pelochelys* and *Amyda* (Figs. 4–7 in the English translation; “*Peolochelys bibroni*” is illustrated as Fig. 4, the type of *R. swinhoei* [BMNH 1947.3.6.13, mis-spelled as “*Ra fhus swinhoci*”] as Fig. 5 in the original). The jugal (zygomatic) arches are curved, not straight. The squamosals projecting backward are parallel. The orbits are large. The nasal bones extend anteriorly beyond the maxillae. The foramen intermaxillaris is large, lozenge-shaped. The two internal nares [apertura narium internum] are round. The supraoccipital is spoon-shaped. The interorbital distance is two-thirds the orbital

diameter. The mandible has a large coronoid process. The maxillary sheath covers the premaxillary and half of the maxilla. The mandibular sheath covers the dentary and front part of the coronary bone. The carapace is oval, of uniform colour with the skin edge soft and thin, and bent posteriorly. Each limb has three large claws. The back, head, and neck are pale gray-brown, the underside pale yellowish, pinkish posteriorly. The withdrawn neck forms skin folds.

According to a popular account by HÀ DÌNH DỨC (apparently published in Sai Gon Giai Phong, March or April 2000; translation courtesy of TRAN DINH HOANH, to FARKAS), a turtle emerged from Hoan Kiem Lake on 10 March 1992 and was photographed by participants of a scientific meeting. The same or another specimen appeared exactly one year later on 10 March 1993. A huge turtle was seen in November 1993 and on several occasions in subsequent years. Illustrated reports were published in local newspapers and were available on the internet; an emergent head (1993 photo) is in HENDRIE (2000: 73, Fig. 4 [via internet]), and probably the same turtle in GUYOT (1999: 8 [unnumbered Fig.]). A live Hoan Kiem Lake turtle (photo 1 November 1993) is in NIEKISCH *et al.* (1997: Figs. 3, 4, colour; Fig. 3 copied [unnumbered, upside down] in GUYOT 1999: 9), who reckoned the carapace length [p. 29 and legend Fig. 4] as about 190cm, a size discounted by PRITCHARD (2001: 14). An illustration accompanying the original description (Fig. 1, 14 March 2000) depicts a large adult along the shoreline of Hoan Kiem Lake (same in PRITCHARD 2001: 12, Fig. 4, colour).

3.3 Distribution

HÀ DÌNH DỨC (2000b: 109) cited the new species as occurring in Hoan Kiem Lake, Hanoi, and in the Quynh Lam Swamp near the town of Hoa Binh (source of paratype). He noted other Vietnam localities of possible occurrence: Chu River (Thanh Hoa Province), Dong Mo Lake (Ha Tay Prov.), and Ao Chau Swamp (Phu Tho Prov.). PRITCHARD (2001:14–15) referred large turtles in northern Vietnam to *Rafetus swinhoei* and noted “mass” occurrence in Ao Chau Swamp/Lake. Another specimen, 38cm carapace length, of *R. swinhoei* was obtained in Hanoi in 1914 (FARKAS 1992, NMW 30.911).

4. Comparisons

The description (above) with many generalized trionychid features does not provide specific statements differentiating *Rafetus leloi* and *R. swinhoei*. However, four characters are listed for species comparison in Table 3: the size of the foramen intermaxillaris and apertura narium internum, neural number, and reduced or normal seventh and eighth pleurals. The first three characters are the same (respectively, large, large, and 8) for both the new species and *R. swinhoei*, whereas both pleurals are listed as reduced for the new species but normal for *R. swinhoei*. However, HÀ DÌNH DỨC's concept of *R. swinhoei* is based at least partly on ZHAO (1997). Included in information and photographs sent to FARKAS by HÀ DÌNH DỨC (in litt., 24 April 2000) is an illustration of a bony carapace labeled *R. swinhoei* that is the same as ZHAO's illustration of *R. swinhoei* (1997: 57, Fig. 3 [right]), which FARKAS & FRITZ (1998) showed to represent a juvenile *Amyda cartilaginea* (also confirmed by PRITCHARD 2001). The genus *Rafetus* is diagnosed by a small (reduced) pair of eighth pleurals (see MEYLAN 1987), and all specimens of *R. swinhoei* examined by FARKAS exhibited this feature (see FARKAS & FRITZ 1998); however, we are unable to account for HÀ DÌNH DỨC's characterization of a reduced seventh pleural as a seemingly diagnostic feature. PRITCHARD (2001: 15, Fig. 8) illustrated bony carapaces of *Rafetus* showing small eighth pleurals. *Rafetus swinhoei* is characterized by reduced callosities on the hyo-hyoplastra, a condition that seems evident in GUYOT's illustration of the large allotype (see above). General aspects of the two different skulls (allotype and paratype) in the original description (2000b: 107, Figs. 2, 3) are not different from those of *R. swinhoei* (2000b: 107, Fig. 5, dorsal view; illustrations also in FARKAS & FRITZ 1998: Figs. 3, 4). HÀ DÌNH DỨC (2000b: 107) also offered for comparison a skull of *Pelochelys "bibroni"* (Fig. 4, dorsal view, PCHP 2921, Penang, Malaysia), and illustrations of specimens

of *P. "bibroni"*, Fig. 1 and of *Chitra indica*, Fig. 2 (both in ERNST & BARBOUR 1989, Pls. 7 and 6, respectively), and the holotype of *R. swinhoei*, Fig. 3 (see FARKAS 1998:27, BMNH 1946.1.22.9; skull catalogued as a separate entry, see under Description). We have been unable to determine any striking difference to warrant taxonomic recognition of *Rafetus leloii*, and propose *R. leloii* as a subjective synonym of *Rafetus swinhoei*.

Rafetus swinhoei displays ontogenetic change in pattern, with the juvenile head and carapace brightly marked with yellow markings (see FARKAS 1998:27, holotype; and FARKAS & FRITZ 1998: 66, side of head of HEUDE's *Yuen maculatus* [= *R. swinhoei*]), which fade with increasing size to a patternless carapace and reduced pattern on the head in large adults; the largest heads have some (maybe indistinct or reduced) maculation (see ZHAO & ADLER 1993: Pl. 20H [head, inset] and I; HENDRIE 2000:73, Fig. 4; and NIEKISCH *et al.* 1997:31, Fig. 5, top of head of ZMB 36437; same in FARKAS 1998: 24 [Fig., in colour]). PRITCHARD (2001:13) noted at most only a few individuals in Hoan Kiem Lake, and his field work in northern Vietnam suggested the species to be extremely rare; HENDRIE (2000:73) noted the species presumably on the verge of extinction.

Acknowledgments

We extend our thanks to Prof. HÀ DÌNH DỨC (Hanoi) for information and photographs about his *Rafetus leloii*, to Dr. THOMAS ZIEGLER (Bonn) who relayed (to FARKAS) that information as well as the English translation (probably by HÀ DÌNH DỨC) of the original description. We thank Dr. UWE FRITZ (Dresden) for sending us copies of the Vietnamese text and a German translation, and for commenting on an early version of the manuscript. WEBB is grateful to Dr. JOHN IVERSON (Richmond) and Dr. KRAIG ADLER (Ithaca) for information acknowledged in the text.

Literature Cited

- CONSTABLE, J.D. (1982): A visit to Vietnam. – *Oryx*, **16**(3): 249–254.
- DAS, I. (1991): Colour Guide to the Turtles and Tortoises of the Indian Subcontinent. – R & A Publ., Portishead (UK), iv + 133 pp.
- ERNST, C.H. & R.W. BARBOUR (1989): Turtles of the World. – Smithsonian Institution Press, Washington, D.C., xxxviii + 578 pp.
- FARKAS, B.L. (1992): Wiederentdeckung eines Exemplars von *Rafetus swinhoei* (GRAY, 1873) im Naturhistorischen Museum Wien. – *Salamandra*, **28**(2): 145–152.
- FARKAS, B.L. (1998): *Rafetus swinhoei*, eine sehr seltene Weichschildkröte. – *Emys*, **5**(1): 23–32.
- FARKAS, B.L. & U. FRITZ (1998): On the identity of *Rafetus swinhoei* (GRAY, 1873) and *Pelochelys maculatus* (HEUDE, 1880) (Reptilia: Testudines: Trionychidae). – *Zool. Abh. Mus. Tierkd. Dresden*, **50**(5): 59–75.
- FARKAS, B.L. & T. ZIEGLER ("2002"[2003]): A note on the distribution of *Amyda cartilaginea* (Boddaert, 1770) in Vietnam. – *Hamadryad*, **27**(1): 149–154.
- GUYOT, G. (1999): Les monstres du lac Hoan Kiem a Hanoi (Vietnam). – *Manouria*, **2**(3): 8–10.
- HÀ DÌNH DỨC (1993): [A preliminary survey on the giant soft-shelled turtle of Hoan Kiem Lake in Hanoi. – The Culture and Information Service of Hanoi, unpublished] (Vietnamese text).
- HÀ DÌNH DỨC (1994): [Morphology, ecology of the giant soft-shelled turtle of Hoan Kiem Lake in Hanoi. – The Culture and Information Service of Hanoi, unpublished] (Vietnamese text).
- HÀ DÌNH DỨC (2000a): Than Rua Ho Guom – Loai Rua moi cho khoa hoc the gioi. – *Dai Doan Ket* [newspaper, Great Solidarity], nos. 7–9, Hanoi, p. 51, February (Vietnamese text).
- HÀ DÌNH DỨC (2000b): Rua Ho Guom Loai Rua Moicho Khoa Hoc. (Turtles in Hoan Kiem Lake, new species for science). – *Khao co Hoc*, **4**: 104–111 (Vietnamese text with English abstract).
- HENDRIE, D.B. (2000): Status and conservation of tortoises and freshwater turtles in Vietnam. pp. 63–73 in: P.P. VAN DIJK, B.L. STUART, & A.G.J. RHODIN (eds.), *Asian Turtle Trade: Proceedings of a Workshop on Conservation and Trade of Freshwater Turtles and Tortoises in Asia*. Chelon. Res. Monogr., **2**: 1–164.
- ICZN (International Commission on Zoological Nomenclature) (1999): International Code of Zoological Nomenclature. – Fourth Edition. Internat'l Trust Zool. Nomencl., London, 306 pp.
- MEYLAN, P.A. (1987): The phylogenetic relationships of soft-shelled turtles (family Trionychidae). – *Bull. Amer. Mus. Nat. Hist.*, **186**(1): 1–101.

- NIEKISCH, M., B. FARKAS, U. FRITZ, & HÀ DÌNH DỨC (1997): Rekordgrößen bei Weichschildkröten im Stadtzentrum von Hanoi, Vietnam. – *herpetofauna*, **19**(107): 28–34.
- PETZOLD, H.-G. (1963): Über einige Schildkröten aus Nord-Vietnam im Tierpark Berlin. *Senckenb. Biol.*, **44**(1): 1–20.
- PRITCHARD, P.C.H. (2001): Observations on body size, sympatry, and niche divergence in softshell turtles (Trionychidae). – *Chelon. Conserv. Biol.*, **4**(1): 5–27.
- RUDDOLPH, M. & R. WESER (1998): Die Weichschildkröten Nordvietnams unter besonderer Berücksichtigung der Nackendornen-Weichschildkröte, *Palea steindachneri* (Siebenrock, 1906). – *Sauria*, **20**(1): 3–14.
- S.Â. (1999): Tin Hieu Moi Nhat Ve Rua Ho Guom. – Tienphong [newspaper, The Avantguard]. Thu Ba so 149, Hanoi, pp. 1 and 2, 4 December 1999 (Vietnamese text).
- WEBB, R.G. ("2002" [2003]): Observations on the giant softshell turtle, *Pelochelys cantorii*, with description of a new species. – *Hamadryad*, **27**(1): 99–107.
- ZHAO, E. & K. ADLER (1993): Herpetology of China. – *Soc. Study Amph. Rept., Contrib. Herpetol.*, (10): 1–522.
- ZHAO, K.-T. (1997): Studies on the classification of Chinese soft-shelled turtles (Trionychidae). – *Sichuan J. Zool.*, **15** (Suppl.): 55–64 (Chinese text with English abstract).

Received on July 27, 2003, accepted on August 11, 2003.