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Neotype of *Testudo terrestris* Forsskål, 1775 (Testudines, Testudinidae)

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Abstract. - We discuss and clarify the nomenclatural status of *Testudo terrestris* Forsskål, 1775. *Testudo terrestris*, a taxon based on a syntype series, was until now a valid name for tortoises from parts of Egypt, Arabia and the Levant, according to the International Code of Zoological Nomenclature. On the contrary, all type locality restrictions from the 20th century regarding the name *Testudo terrestris* Forsskål, done without the fixation of a name-bearing specimen (lectotype or neotype), are invalid. Because the name is valid, and because the syntypes, listed but not identified in the original description, are untraceable, and to permanently fix the name and its type locality, we designate a neotype for *Testudo terrestris* Forsskål based on a specimen from Aleppo, Syria.

Key words. - Taxonomy, Testudines, Testudinidae, *Testudo terrestris* Forsskål, 1775, nomenclatural validity, neotype.

Forsskål and Mediterranean tortoises. - During his fatal travel (1761-1763) in the eastern Mediterranean countries, the Finn Petter Forsskål (1732-1763) encountered tortoises, briefly described by the name *Testudo terrestris* in his diary, which was published as a posthumous work by Carsten Niebuhr (1733-1815), a German traveller and surveyor, in 1775 [= Forsskål, 1775]. Strauch (1862: 69) remarks in a footnote that Forsskål (1775) discusses a tortoise, *Testudo terrestris*, which occurs in Aleppo and Lebanon, without describing it, and Anderson (1896: 68) writes that "it is useless attempting to identify this animal" "from Loheia, north of Hodeida," with reference to Forsskål (1775). Forsskål's itinerary took him through the following localities: Malta, Smyrna (Izmir), Constantinople, Alexandria, Rosetta, Cairo, Suez, Jedda, ending up in Yarim, Arabia Felix (Yemen), where Forsskål died of malaria in 1763. Tortoises were reported from Al Luḥayyah (Yemen), Cairo (Egypt), Lebanon, Lattakia (Al Lādhiqīyah) and Aleppo (both in Syria) (Fig. 1). Forsskål (1775) indicated that the chelonians are called "Zolhafae" by the Arabs (Forsskål, 1775); as for their distribution, he specified: "Kahirae non frequens vivit, Aleppo autem & ad Libanon copiosor," translated by Daudin (1801: 225) as: "It is rare in Cairo, but can be found rather abundantly near Aleppo and towards Mount Lebanon". At best, Forsskål himself was thus able to see tortoises *in situ* in northern Egypt (Nile Delta and Suez area) only, that is those which are actually called either *Testudo kleinmanni* Lortet, 1883 (the Egyptian tortoise) or the vicariant *T. werneri* Perälä, 2001. This interpretation is in accordance with the vernacular name of the Egyptian tortoise, *fide* Anderson (1898: 30; "Sohlafa" pronounced "Zihlifa") and Flower (1933: 742; "Educated people in Egypt employ the word 'Zalheefah'"). Niebuhr's subsequent route back home took him via Basra, Baghdad, Mosul, Diyarbakır, Aleppo, Lebanon and Palestine (Hansen, 1962; Niebuhr, 1772, 1973). Niebuhr, the only surviving member on the expedition to Arabia Felix, continued to Bombay (Mumbai), India, from where he shipped the natural history notes (Niebuhr, 1772: xix) and specimens (Niebuhr, 1973: 120) collected by Forsskål via London to Copenhagen. A considerable amount of material in the Forsskål collection in Copenhagen was destroyed in bombings by the British in 1807 (Nielsen, 1993). The type of *T. terrestris* is said to be "apparently lost" (Webb in Iverson, 1992). The name is not fixed to a single name-bearing specimen.

Nomenclatural validity of *Testudo terrestris*. - *Testudo terrestris* Forsskål, 1775, one of the oldest species group names in the genus *Testudo* Linnaeus, 1758 *sensu lato* (in the sense of Lapparent de Broin, 2001; Perälä 2002a), is nomenclaturally valid, according to the present International Code of Zoological Nomenclature (ICZN, 1999): it was published before 1931 and thus does not need to have a full diagnosis by which it can be identified. Only "a description or a definition" *per se* is needed (ICZN, 1999: Article 12). In this respect the remark by Forsskål (1775) pertaining to the tortoises' length ("...foot-long..."), as well as that made of the shapes of plastra of both sexes, is enough, even if these characters were incorrect. Moreover, although the name

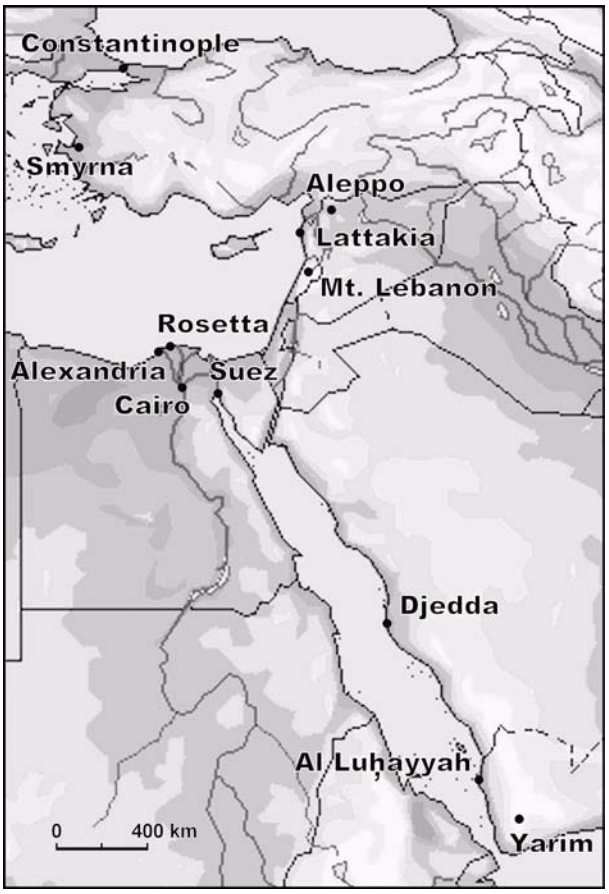

Figure 1. Map of geographical localities mentioned in Forsskål's (1775) description, which together constituted the type locality of *Testudo terrestris* Forsskål until the present work.

is accompanied by the remark "Obs." (Forsskål, 1775: 12), it is also listed under the headings "Descripta" (p. viii) as well as "Nominata" (p. ix) alongside with valid names such as *Testudo triunguis* Forsskål, 1775, that is, current *Trionyx triunguis*. The book contains a multitude of other descriptions of valid taxa which cannot be rejected based on the arguments (see below) about the use of the Latin language, a contemporary standard, alone. Based on Niebuhr's subsequent route back home, Gasperetti et al. (1993) suggested that it may actually be Niebuhr who is responsible for the name *T. terrestris* Forsskål. As Niebuhr's role is not explicit in the original publication, the authorship of the name remains with Forsskål (ICZN, 1999: Art. 50.1.1).

***Testudo terrestris* overlooked, rejected, then revalidated**. - After its publication, and during about 180 years, the nominal species *Testudo terrestris* Forsskål, 1775, although nomenclaturally valid, was nevertheless overlooked by most authors (except Strauch, 1862 and Anderson, 1896), some of them (Gray, 1831; Duméril and Bibron, 1835) only mentioning *Testudo zolkafa* and *Testudo zohalfa*, respectively, based on Forsskål's (1775) vernacular Zolhafae, and which nomina nuda appear in the above works as synonyms of *Testudo graeca* Linnaeus, 1758 and *Testudo mauritanica* Duméril and Bibron, 1835, respectively. On the other hand, at least one scientist worked to revive the nominal species. A brief history of the case is presented by Bour in David (1994: 86). The name *Testudo terrestris* Forsskål was resurrected, and therefore revalidated, by Wermuth (1956: 402), who improperly (without specimen fixation) designated "Arabia" as type locality. Simultaneously, Wermuth considered to ask the International Commission on Zoological Nomenclature to invalidate the nominal species *Testudo terrestris* Forsskål; unfortunately, his attitude changed radically (1958: 149-153) and he used this name to designate the Near Eastern population of *Testudo* (as *Testudo graeca terrestris* Forsskål), restricting the type locality to "Libanon-Gebirge, Israel" [sic], and mistakenly extending its range to Libya. It must be outlined that there is a gap in the range of *Testudo graeca* (*sensu lato*) complex tortoises between Israel and Libya, the latter containing the range of the recently described species *Testudo cyrenaica* Pieh & Perälä, 2002. Wermuth had at his disposal one Libyan specimen (SMF 36127; paratype of *T. cyrenaica*), from Dernah, which he thought to be identical with Middle-Eastern tortoises (Pieh & Perälä, 2002). Wermuth's validation was disapproved by Buskirk (in Ernst et al., 2000; unpublished manuscript from the early 1990s; and pers. comm. to both authors); Highfield (in Ernst et al., 2000; and: http: //www.tortoisetrust.org/articles/newfloweri.html); J. F. Parham (pers. comm.); and Perälä (1996); among others. Their opposition is based on several arguments such as: a description is lacking with reference to the remark "Obs." in Forsskål (1775); the species cannot be identified from the "description"; there is no type specimen; a "false" type locality; the name "*Testudo terrestris*" is just Latin for a terrestrial chelonian, used without intention to describe a new species.

Need of a neotype. - Rather to resurrect *Testudo terrestris* Forsskål (Wermuth, 1956), it would have been preferable: (1) either to suppress this imprecise name (and which is a more recent homonym of the nominal species *Testudo terrestris* Fermin, 1765, for which Wermuth had to successfully request the invalidation by the International Commission on Zoological Nomenclature; ICZN, 1963: Opinion 660); (2) either to use it to name *Testudo kleinmanni*, a name revalidated only in the 1950s by Mertens & Wermuth (1955), and independently by Loveridge & Williams (1957). It could still be possible to ask the ICZN to officially suppress the name *Testudo*

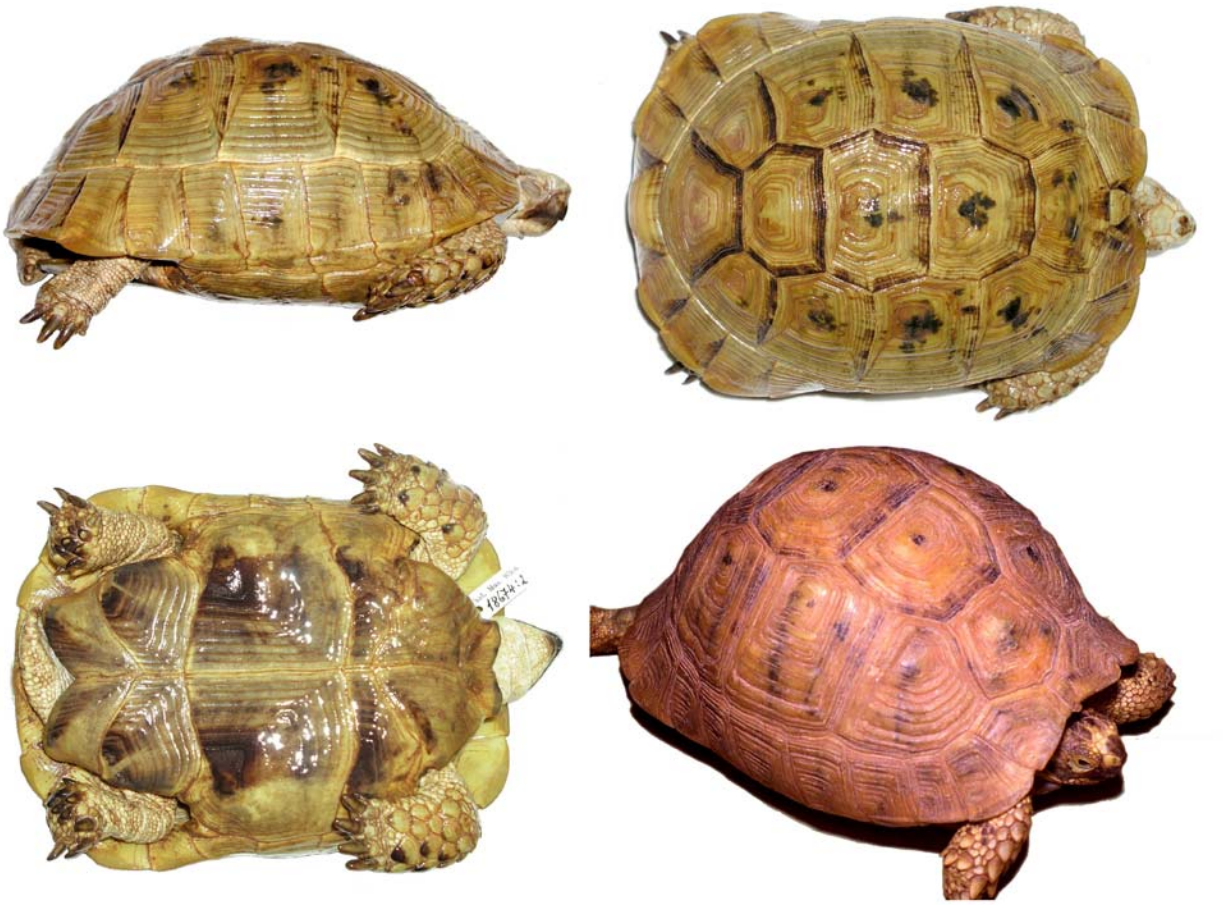

Figure 2. Neotype of *Testudo terrestris* Forsskål, 1775, specimen n° NMW 18674: 2, sub-adult female. Upper left: lateral view (right side); Upper right: dorsal view; Lower left: ventral view. Lower right: living specimen of *Testudo terrestris*, adult female, from Aleppo (topotype); CL = 185 mm, MI = 143 mm, HE = 99 mm.

terrestris Forsskål, 1775. However, we reject this option because: (1) the name is presently widely used (in all recent check-lists, with more than fifty references), although with vagueness about the identity of the concerned population; (2) there is no valid name to designate the species of *Testudo* living in the Middle-East, more precisely in the area of the upper Euphrates - Tigris drainage; (3) the name *Testudo terrestris* Forsskål, 1775 became available by the very ruling of the International Commission on Zoological Nomenclature (ICZN, 1963), and it is unlikely that the Commission would reverse its opinion. Accepting the nomenclature proposed by Wermuth, one of us (RB) proposed to emend the type locality of *Testudo terrestris* Forsskål to the vicinity of Aleppo (= Halab), Syria (Bour, 1989: 14), in the interest of clarifying the status of this taxon and as a first step towards the description of a neotype. However, such restriction of the type locality, as well as the earlier restrictions proposed by Wermuth (1956, 1958), are invalid according to the Code (ICZN, 1999; Art. 76.3), because these actions were not done in connection with the selection of a lectotype or neotype. Therefore we here propose the formal description of a neotype of *Testudo terrestris* Forsskål, 1775. All the animals listed (although not identified; therefore untraceable) by Forsskål (from Al-Luḥayyah, Cairo, Lebanon, Lattakia and Aleppo) actually represent syntypes, according to the Code (ICZN, 1999; Art. 72.1.1), and thus the type locality of *T. terrestris* encompasses the region containing all those localities (ICZN, 1999; Art. 73.2.3). A neotype could legitimately be selected from any of those *per se*. Besides sea turtles, only *Centrochelys sulcata* (Miller, 1779), a land tortoise (possibly introduced), and *Pelomedusa subrufa* (Lacepède, 1788), a fresh-water turtle, are known to occur in Yemen (Obst & Wranik, 1987; Gasperetti et al., 1993; Al Safadi, 1997); therefore no *Testudo* sp. could have been observed in Al-Luḥayyah by the Forsskål - Niebuhr expedition. Following the earlier choice, made in accordance with the available data, and also with the current taxonomical practice (e.g., Perälä, 2002b), in order to preserve the stability of the nomenclature, and

to objectively delimit *Testudo terrestris* Forsskål from all other species in the *Testudo graeca* (*s.l.*) complex, we choose a specimen collected in Aleppo (and which locality has by chance a historical background in tortoise literature: cf. Siebenrock, 1913).

The neotype of *Testudo terrestris*. - To fix the name and type locality, we hereby designate a specimen from the Vienna Natural History Museum No. NMW 18674:2, collected in Aleppo by Viktor Pietschmann in March 1910, as the neotype of *Testudo terrestris* Forsskål, 1775, according to Articles 75 and 76 (ICZN, 1999). The neotype is a subadult female with a straight-line carapace length (CL) of 136.8 millimeters. Note: all morphometric characters are according to the standards published in Perälä (2001). As a result of our neotype designation (ICZN, 1999; Art. 76.3), the type locality of *Testudo terrestris* Forsskål, 1775 is restricted to Aleppo (Alep, Halab; 36°12' N, 37°09' E), Syria (Syrian Arab Republic). (For the range of *T. terrestris*, see Perälä, 2002b.)

Description. – Sub-adult female. Most scutes marked with about a dozen of conspicuous growth ridges and grooves; areolae of the carapace feebly bumped, neatly displaced caudally, and also dorsally on the costals. Longitudinal profile high, regularly domed, highest at third vertebral, slightly behind the middle of the shell (Fig. 2, top left). The outline of the shell short, squarish, anterior and posterior free borders only very feebly cut out. Vertebrals wide in dorsal view, the fourth the smallest; the first one with almost straight lateral borders, moderately wider anteriorly than posteriorly (Fig. 2, top right). Cervical (= nuchal) four-sided, very wide; supracaudal distally as wide as vertebrals, regularly convex in its middle; all common sutures of marginals nearly sub equal (= height of lateral ones, and length of anterior and posterior ones); only marginals 9-11 are slightly flaring. Gulars well prominent but short and narrow, their common suture very short; a pair of rather large axillaries on each side; pectorals with a very short common (medial) suture, included about four times in the medial suture of humerals; inguinals small, separated in a larger distal part and a very small proximal part contacting femorals; rear lobe of plastron hardly mobile, short, anals both long and wide, with parallel anterior and posterior borders: their particular shape at first sight resembles the usual shape observed in males (Fig. 2, bottom left). Head covered above with two large and roughly pentagonal scutes, the frontal and the prefrontal, symmetrical about their common suture. Five nails at each hand, the inner one smaller but well developed; four at each foot. Anterior side of the fore-arm covered between the elbow and the wrist by about fifteen large scutes, the four largest being triangular, neatly distinct from the background of the scaly skin; outer border of this area covered by a row of six triangular, overlapping scutes. Tail relatively long and regularly tapering, also giving a rather masculine appearance, ending with slightly enlarged but discrete flat scutes; a small isolated spur on each thigh.

General color greenish yellow, often lighter close to the sutures, with large darker, grayish areas apparently deep in the scutes. Blackish marks reduced on the carapace, limited to incomplete and irregular narrow lines along the anterior sutures of the scutes (marginals, costals), also on the lateral borders of vertebrals; areolae or areolar areas slightly and irregularly flecked with black, on costals 1-3 and on vertebrals 1-3. Dark patches wider on the plastron, issued from the areolae, roughly extending along the rear third of each scute (from pectorals to anals), restricted to a narrow band on the humerals; limits of the patches are inconspicuous, with a gradual shading, delimiting few lighter or darker radiating lines. Soft parts mostly yellowish, in places with a brownish tinge, with well contrasting blackish flecks on the horny beak (upper and lower, forming a 'moustache'), on prefrontal, on the large triangular scutes of the fore-arms, and on the heels; all nails are also heavily pigmented, from dark brown to black.

Additional morphometric data derived from the neotype are presented in the following (all measurements in mm): maximum plastron length (PL) = 122.7, midline plastron length (PL-m) = 111.8, maximum midbody width (MI) = 100.2, maximum width of shell at posterior marginals (MA) = 104.4, maximum gular scute length (GU-l) = 15.3, maximum gular scute width (GU-w) = 27.3, gular scute height (GU-h) = 13.2, maximum shell height (HE) = 70.0, maximum width of anterior shell opening (ASO-w) = 69.9, maximum height of anterior shell opening (ASO-h) = 21.9, left minimum bridge length (BR) = 59.9, maximum humeral scute width (HUM-w) = 63.7, maximum pectoral scute width (PEC-w) = 86.6, maximum abdominal scute width (ABD-w) = 89.9, maximum femoral scute width (FEM-w) = 64.1, maximum anal scute width (AN-w) = 51.9, maximum nuchal scute length (NU-l) = 11.4, maximum nuchal scute width (NU-w) = 10.0, intergular length (GU-m) = 13.4, interhumeral length (HUM-m) = 22.8, interpectoral length (PEC-m) = 7.7, interabdominal length (ABD-m) = 42.1, interfemoral length (FEM-m) = 10.8, interanal length (AN-m) = 18.7, maximum width of first vertebral scute (V1-w) = 35.2, maximum width of second vertebral scute (V2-w) = 36.4, maximum width of third vertebral scute (V3-w) = 41.0, maximum width of fourth vertebral scute (V4-w) = 33.8, maximum width of fifth vertebral scute (V5-w) = 41.3, maximum length of first vertebral scute (V1-l) = 26.9,

maximum length of second vertebral scute (V2-l) = 28.0, maximum length of third vertebral scute (V3-l) = 25.6, maximum length of fourth vertebral scute (V4-l) = 23.3, maximum length of fifth vertebral scute (V5-l) = 31.8, first costal length (C1) = 43.0, second costal length (C2) = 28.7, third costal length (C3) = 28.1, fourth costal length (C4) = 22.9, maximum dorsal width of supracaudal (SUP-d) = 23.4, maximum ventral width of supracaudal (SUP-v) = 40.4, maximum median length of supracaudal (SUP-l) = 21.7, maximum head width (HEAD) = 21.6, minimum distance between right eye and tympanum (EYE-TY) = 6.9, minimum distance between right eye and nostril (EYE-NO) = 6.5.

Figure 2 (lower right) depicts a living female (topotype) *Testudo terrestris* Forsskål from the type locality, Aleppo, Syria.

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Literature Cited

Al Safadi, M. M. 1997. Yemeni Turtles & Tortoises. Yemen Times, vol.VII, 51 (last page), and http://www.yementimes.com/97/iss51/lastpage.htm.

Anderson, J. 1896. Sketch of the literature bearing on the reptilian and batrachian fauna of Arabia. Part IV. Pp. 68-76. In A Contribution to the Herpetology of Arabia with a Preliminary List of the Reptiles and Batrachians of Egypt. R. H. Porter, London.

Anderson, J. 1898. Zoology of Egypt. I. Reptilia and Batrachia. Bernard Quaritch, London. Reprinted as fac simile in 1965 (Wheldon & Wesley and J. Cramer, Codicote and Weinheim). i-lxv, 371 pp., pl. 1-7 + pl. 1-50.

Bour, R. 1989. Caractères diagnostiques offerts par le crâne des tortues terrestres du genre *Testudo*. Mésogée 48 (1988):13-19.

David, P. 1994. Liste des reptiles actuels du monde. I. Chelonii. Dumerilia 1:1-127.

Duméril, A. M. C. and G. Bibron. 1835. Erpétologie générale ou histoire naturelle complète des reptiles. Tome 2. Librairie Encyclopédique de Roret, Paris. i-ii, 680 pp.

Ernst, C. H., R. G. M. Altenburg and R. W. Barbour 2000. Turtles of the World: World Biodiversity Database CD-ROM Series. Expert Center for Taxonomic Identification, University of Amsterdam & UNESCO-Publishing, Paris.

Flower, S. S. 1933. Notes on the recent reptiles and amphibians of Egypt, with a list of the species recorded from that Kingdom. Proceedings of the Zoological Society, London 1933:734-851.

Forskål [sic], P. 1775. Descriptiones Animalium, Avium, Amphibiorum, Piscium, Insectorum, Vermium; quae in itinere orientali observavit Petrus Forskål Prof. Haun. Post mortem auctoris edidit Carsten Niebuhr. Heineck & Faber, Hauniae (Copenhagen). xxxiv, 164 pp.

Gasperetti, J., A. E. Stimson, J. D. Miller, J. P., Ross and P. R. Gasperetti. 1993. Turtles of Arabia. Fauna of Saudi Arabia, Riyadh, 13:170-367.

Gray, J. E. 1831. Synopsis Reptilium; or short descriptions of the species of Reptiles. Part I. – Cataphracta. Tortoises, Crocodiles, and Enaliosaurians. Treuttel, Wurtz, and Co., London. i-vii, 85 pp., pl. 1-7.

Hansen, T. 1962. Det Lyckelige Arabien. En Dansk Expedition 1761-1767. Nordisk Forlag, København (Copenhagen). 376 pp.

ICZN. 1963. Opinion 660. Suppression under the plenary powers of seven specific names of turtles (Reptilia: Testudines). Bulletin of Zoological Nomenclature 20:187-190.

ICZN. 1999. International Code of Zoological Nomenclature. Fourth Edition adopted by the International Union of Biological Sciences. ITZN, London. i-xxix, 306 pp.

Iverson, J. B. 1992. A Revised Checklist with Distribution Maps of the Turtles of the World. (Privately published) Richmond, Indiana. 363 pp.

Lapparent de Broin, F. de, 2001. The European turtle fauna from Triassic to the present. Dumerilia 4(3):155-217.

Loveridge, A. and E. E. Williams. 1957. Revision of the African tortoises and turtles of the suborder Cryptodira. Bulletin of the Museum of Comparative Zoology at Harvard College 115(6):160-557, 18 pl.

Mertens, R. and H. Wermuth. 1955. Die rezenten Schildkröten, Krokodile und Brückenechsen. Eine kritische Liste der heute lebenden Arten und Rassen. Zoologische Jahrbücher (Systematik) 83:323-440.

Niebuhr, C. 1772. Beschreibung von Arabien Aus eigenen Beobachtungen und im Lande selbst gesammleten [sic] Nachrichten abgefasst von Carsten Niebuhr. Nicolaus Möller, Kopenhagen (Copenhagen). i-xlvii, 3 unpaginated lists and 432 pp + 24 pl.

Niebuhr, C. 1973. Carsten Niebuhr. Entdeckungen im Orient. Reise nach Arabien und anderen Ländern 1761-1767 (Grün, R. & Grün, E., eds.). Horst Erdmann Verlag. 332 pp. [Niebuhr's diaries in one volume. Originally: Carsten Niebuhrs Reisebeschreibung nach Arabien und anderen umliegenden Ländern. Erster, Zweiter & Dritter Band, 1774, 1778 & 1837. Nicolaus Möller, Copenhagen, original publisher.]

Nielsen, J. G. 1993. Peter Forsskål - a pioneer in Red Sea ichthyology. Israel Journal of Zoology 39:283-286.

Obst, F. J. and W. Wranik. 1987. Contributions to the herpetology of the People's Democratic Republic of Yemen. I. The occurrence of *Pelomedusa subrufa* in the southern Arab Peninsula (Reptilia, Testudines, Pleurodira). Zoologische Abhandlungen, Staatliches Museum für Tierkunde Dresden 43(2):15-20.

Perälä, J. 1996. [Tortoises in southern Turkey]. In Herpetokongressi 1 - The Official Congress Publication (M. Kanza, J. Perälä & J. Vikberg, eds):14-26. The Herpetological Society of Finland, Helsinki. (In Finnish).

Perälä, J. 2001. A new species of *Testudo* (Testudines: Testudinidae) from the Middle East, with implications for conservation. Journal of Herpetology 35(4):567-582.

Perälä, J. 2002a. The genus *Testudo* (Testudines: Testudinidae): Phylogenetic inferences. Chelonii 3:32-39.

Perälä, J. 2002b. Morphological variation among Middle Eastern *Testudo graeca* L., 1758 (*sensu lato*) with a focus on taxonomy. Chelonii 3:78-108.

Pieh, A. and J. Perälä. 2002. Variabilität von *Testudo graeca* Linnaeus, 1758 im östlichen Nordafrika mit Beschreibung eines neuen Taxons von der Cyrenaika (Nordostlibyen). Herpetozoa 15 (1/2):3-28.

Siebenrock, F. 1913. Schildkröten aus Syrien und Mesopotamien. Annalen des k. k. Naturhistorischen Hofmuseums 27:171-225.

Strauch, A. 1862. Chelonologische Studien mit besonderer Beziehung auf die Schildkrötensammlung der kaiserlichen Akademie für Wissenschaften zu St. Petersburg. Mémoires de l'Académie impériale des Sciences de Saint-Pétersbourg (VII)5(7):1-196.

Wermuth, H. 1956. Versuch der Deutung einiger bisher übersehenen Schildkröten-Namen. Zoologische Beiträge 2:399-423.

Wermuth, H. 1958. Status und Nomenklatur der Maurischen Landschildkröte, *Testudo graeca*, in SW-Asien and NO-Afrika. Senckenbergiana biologica 39(3/4):149-153.