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Geographic Distribution of the Southeast Asian Turtles in the Genus *Malayemys* (Testudines: Bataguridae)

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Introduction

Members of the genus *Malayemys*, Malayan snail-eating turtles, are small batagurid turtles reaching maximum sizes of 22 cm carapace length (Srinarumol, 1995). They have dark brown to mahogany carapaces with three discontinuous keels, yellow plastra with large dark blotches on each scute, and large black heads adorned with yellow or cream-colored stripes that extend onto their necks (Ernst et al., 2000). *Malayemys* inhabit lowland freshwater habitats throughout Southeast Asia including ponds, canals, streams, swamps, marshes and wet rice fields. These are diurnal bottom dwellers that feed primarily on mollusks (Smith, 1931; Taylor, 1970; Nutaphand, 1979; Srinarumol, 1995; Ernst et al., 2000; van Dijk and Thirakhupt, in press). Populations of *Malayemys* can be found in virtually all lowland areas of central Thailand, where they are the most commonly found wild turtle (van Dijk and Thirakupt, in press). Population status outside of central Thailand is poorly documented. Members of this genus are presumed to be abundant in southern Vietnam (Bourret, 1939; Geissler and Jungnickel, 1989; van Dijk and Thirakhupt, in press), less abundant in peninsular Thailand (van Dijk and Thirakhupt, in press), and rare on Java (van Dijk and Thirakhupt, in press; Peter C. H. Pritchard, pers. com.).

Many Southeast Asian turtle species are in rapid decline because of serious pressure from commercial exploitation and habitat destruction (Behler, 1997; Thirakhupt and van Dijk, 1997; van Dijk et al., 2000). Improved legislation and enforcement, community education, population monitoring, and life history studies are all crucial to the long-term survival of most of these species. None of this can occur, however, without detailed records on the geographic distribution of these organisms. This paper presents a detailed table and map that clearly define the geographic distribution of turtles in the genus *Malayemys*. No other account is based on such a complete compilation of data.

Methods and Materials

Brophy (2004) recently completed a detailed study of geographic variation in turtles from the genus *Malayemys* and argued for the existence of two distinct species: *M. subtrijuga* (Schlegel and Müller, 1844) from the Mekong River Basin of eastern Thailand, Laos, Cambodia, and southern Vietnam; and *M. macrocephala* (Gray, 1859) from the Chao Phraya and Mae Klong basins of central Thailand, the coastal areas of southeastern Thailand and Cambodia, and the Malay Peninsula in southern Thailand and northern Malaysia.

In the current paper, distribution data from available museum and literature records is used to clarify the geographic distributions of these two species. Information includes country and watershed of origin (watershed designations follow Kottelat, 1989), specific locality data (if available), latitude and longitude coordinates, museum catalog number, and/or literature reference(s). Comments on the distribution of these species are also provided below.

Museum abbreviations follow Leviton et al. (1985) and Leviton and Gibbs (1988) with the following additions: CRI = Chelonian Research Institute, Oviedo, Florida, USA; KUZ = Kyoto University Zoological Collection, Kyoto, Japan; RH = personal collection of Ren Hirayama, Teikyo Heisei University, Ichihara, Chiba, Japan; ZRC = Raffles Museum of Biodiversity Research, Zoological Reference Collection, The National University of Singapore, Singapore.

Results and Discussion

Based on data from available museum and literature records (Figure 1 and Table 1), specimens of the genus *Malayemys*

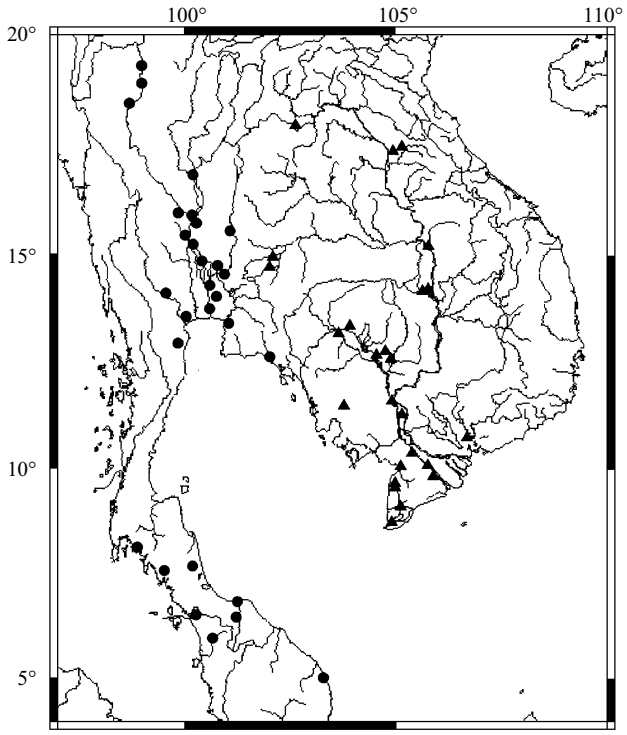

Figure 1. Distribution map for *Malayemys subtrijuga* (Schlegel and Müller, 1844) (triangles) and *Malayemys macrocephala* (Gray, 1859) (circles) based on available museum and literature records.

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have been found in the Chao Phraya and Mae Klong basins of Thailand; portions of the lower Mekong basin in eastern Thailand, Laos, Cambodia, and southern Vietnam; coastal areas of southeast Thailand; the Malay Peninsula in peninsular Thailand and northern Malaysia; the Greater Sundan islands of Java and Sumatra; and markets in southern China and northern Vietnam.

Records from the Chao Phraya and Mae Klong basins of Thailand are abundant. *Malayemys macrocephala* has been recorded in the Chao Phraya basin from Chon Buri and Bangkok in the south, Chiang Mai in the north, Kamphaeng Phet Province in western Thailand, Phetchabun Province in the eastern portion of the basin, and many areas in between. In the Mae Klong basin, *M. macrocephala* has been recorded from Kanchanaburi, Phetchaburi, Ratchaburi, and Samut Songkhram provinces.

Fewer records for *M. macrocephala* are known from other portions of its range. A single record exists for Laem Sing in the southeast coastal areas of Thailand. Records are known from the east coast *Melaleuca* swamps in Terengganu, Malaysia and from the northern Malaysian states of Kedah and Perlis. Several records also exist for peninsular Thailand including Krabi, Pattani, Phatthalung, Trang, and Yala.

Malayemys macrocephala may also occur in Myanmar. Platt et al. (2000) listed its status in Myanmar as "not yet recorded; possibly occurs in Tenasserim" [presently Tanintharyi Division]. More recently, Win Maung and Win Ko Ko (2002) recorded *Malayemys* as part of the Myanmar turtle fauna, and gave its range as "Tanintharyi Division, Mon State, Kayin State, Kayah State." No specimens were referenced and no source was given for this information, so its accuracy cannot be determined. It seems entirely possible, however, that *M. macrocephala* does occur in Tanintharyi Division. This area is found in the Malay Peninsula "drainage basin" (Kottelat, 1989), just like several localities in peninsular Thailand and northern Malaysia for which there are confirmed records.

Records for *M. subtrijuga* from the Mekong basin are less abundant, but a substantial number still occur. *Malayemys subtrijuga* has been recorded from Amphoe Pak Thong Chai and Nakhon Ratchasima in the Thailand portion of the basin; Vientiane Municipality as well as Attopeu, Bolikhamxay, Champasak, Khammouane, Savannakhet, and Vientiane provinces in Laos; and Battambang, Kampong Chhnang, Kampong Thom, Kandal, Koh Kong, and Siem Reap provinces as well as Phnom Penh Municipality in Cambodia. Most records from the Mekong basin, however, come from southern Vietnam. *Malayemys subtrijuga* has been recorded from Ca Mau, Can Tho province, Ho Chi Minh City, Long Xuyen, Nam Can, Phung Hiep, Rach Gia, and the U Minh Region of Ca Mau and Rach Gia provinces.

Members of this genus have also been recorded from several places in Indonesia. There is a single record for *Malayemys* (species unknown) from Duri, Sumatra, and a few records (mixed species) from "Sumatra" only. These Sumatran records are most likely based on imported specimens or faulty locality data. Several herpetofaunal surveys have failed to locate *Malayemys* on Sumatra (de Rooij, 1915; van de Bunt, 1990; Fritz and Gaulke, 1997; Gaulke et al., 1998; Shepherd, 2000) and current reptile dealers have little or no knowledge of their presence there (Shepherd, 2000). Brophy's (2002, 2004) results suggest that Sumatran specimens are of mixed origin and were, therefore, likely introduced or mislabeled. A single record also exists for *Malayemys* (species unknown) from Borneo (Wetlands International Indonesia Program, Wetlands Database *in* Samedi and Iskandar, 2000). This record is questionable (Samedi and Iskandar, 2000) and, if legitimate, is probably based on imported specimens or a misidentification. I found no such museum specimens, and Lim and Das (1999) make no mention of the presence of *Malayemys* on Borneo.

Malayemys subtrijuga has been found on Java in Banten, Cirebon, Depok, Jakarta, Surabaya, and Tasikmalaya. The question as to its natural occurrence there, however, is a complex issue. *Malayemys subtrijuga* has been known from Java for almost 200 years (Temminck and Schlegel, 1834; Schlegel and Müller, 1844; Hoogmoed, 1982). In fact, the syntypes of *M. subtrijuga* (Schlegel and Müller, 1844) were collected in Java's Bantam Province (Temminck and Schlegel, 1834; Schlegel and Müller, 1844; Hubrecht, 1881). There are several lines of evidence, however, that lead me to conclude that *M. subtrijuga* is not native to Java (Dammerman, 1929; Ernst et al., 2000; van Dijk and Thirakhupt, in press). First, recent reports indicate that populations of *M. subtrijuga* on Java are dwindling or extinct (Samedi and Iskandar, 2000; van Dijk and Thirakhupt, in press; Peter C. H. Pritchard, pers. com.). This may be due in part to the small size of introduced founding populations, but may also be due to extensive long-term habitat alteration on Java (Whitten et al., 1996; Manthey and Grossman, 1997; FAO, 2001; Peter Paul van Dijk, pers. com.). Second, history indicates that humans have been moving between Java and the Southeast Asian mainland for over two thousand years (Whitten et al., 1996; Schwartzberg and Bajpai, 1992). Since *M. subtrijuga* is commonly used for food (van Dijk and Palasuwan, 2000; van Dijk and Thirakhupt, in press) and religious practices (van Dijk and Palasuwan, 2000; Hendrie, 2000; van Dijk and Thirakhupt, in press) by non-Islamic peoples (Whitten et al., 1996), it is conceivable that it was brought to Java for one or both of these reasons. Third, the known distribution of *M. subtrijuga* on Java is primarily limited to port cities on the northern coast. This type of distribution is expected for an introduced species (Inger, 1966). Fourth, analyses of ancient river systems suggest that *M. subtrijuga* could not have reached Java from the Southeast Asian mainland without passing through either Borneo or Sumatra (Burridge, 1992; Lovich, 1994; Inger, 1999; Voris, 2000), and since it is not found on these islands, an introduced origin is possible. Finally, Brophy's (2002, 2004) results suggest that *Malayemys* from Java are morphologically similar to those from the Mekong River Basin and were, therefore, possibly introduced primarily from that region.

It is also possible, however, that populations of *M. subtrijuga* on Java are Pleistocene relicts. One interesting zoogeographical feature of Southeast Asia is the correspondence between the monsoon East Javan and monsoon mainland Southeast Asian faunas in contrast to the fauna of the rainforest belt

(Thai-Malay Peninsula, Sumatra, and Borneo) (Peter Paul van Dijk, pers. com.). The Banteng (*Bos javanicus*), Javan rhinoceros (*Rhinoceros sondaicus*), and Russell's viper (*Daboia russelii siamensis*) are all examples of species occurring in Java and the monsoon mainland but not the rainforest belt (Lekagul and McNeely, 1977; Peter Paul van Dijk, pers. com.). Since none of these would have been transported by humans, they are probably relict populations of a wider Pleistocene distribution, when a drier climate created deciduous forests and seasonally fluctuating rivers and floodplains over a much wider region (Lekagul and McNeely, 1977; Whitten et al., 1996; Peter Paul van Dijk, pers. com.). Even though *M. subtrijuga* is more likely than the above species to have been transported by man, it is possible that it too is a Pleistocene relict.

Despite this possibility, it is likely that *M. macrocephala* and *M. subtrijuga* are two of the many Indochinese endemics whose populations are primarily found north of the Isthmus of Kra (Lovich, 1994; Rainboth, 1996; Inger, 1966, 1999). Lovich's (1994) analysis of the zoogeography of Southeast Asian turtles suggests that less than 50% of Indochinese turtles are found south of the Isthmus of Kra. The Isthmus of Kra has acted as an effective barrier to migration for many turtle species because it coincidentally lies at the boundary of two distinct climatic regions. To the south of Kra, aseasonal conditions occur with year-round rain, tropical evergreen rainforests and higher temperatures. To the north of Kra, seasonal monsoons occur with mainly deciduous forests and lower temperatures (Lovich, 1994; Rainboth, 1996; Inger, 1966, 1999). Lovich's (1994) analysis also suggests that Southeast Asia consists of two primary faunal regions, a mainland Indochinese region and a Sundaic region (Malay Peninsula, Sumatra, Borneo, and Java). The existence of distinct Indochinese and Sundaic faunas is supported by the distribution patterns of fish (Kottelat, 1989; Rainboth, 1996), amphibians (Inger, 1966, 1999), and mammals (Lekagul and McNeely, 1977; Corbet and Hill, 1992). Animals that do not occur south of the Isthmus of Kra, like *Malayemys*, may have been poor dispersers, may have arrived at the Sunda Shelf too late (i.e., after the last exposure in the late Pleistocene), or may have gotten caught on the shelf during one of the many times sea levels rose during the Pleistocene (Lovich, 1994).

In addition to the many Southeast Asian records, members of the genus *Malayemys* have been found in several markets in China and northern Vietnam. These include records from Guangzhou (Farkas and Sasvári, 1992; Kuchling, 1995; Artner and Hofer, 2001) and Shenzhen (Kuchling, 1995) in southern China and those from Hanoi, Mon Cai, and Lang Son in northern Vietnam (Le Dien Duc and Broad, 1994, 1995). These areas are far outside the suspected natural range of this genus and any individuals found there were most certainly imported (Farkas and Sasvári, 1992; Kuchling, 1995; Artner and Hofer, 2001; van Dijk and Thirakhupt, in press).

Acknowledgments

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Table 1. Geographic distribution of turtles in the genus *Malayemys*. Based on available museum and literature records.

Species	Watershed	Country	Specific Locality	Latitude/ Longitude	Reference
M. macrocephala	Chao Phraya	Thailand	Ayutthaya, Ayutthaya Prov.	14.350 100.550	Flower, 1899
			Bangkok	13.733 100.500	AMNH R-80925, R-92277-79, R-94563; BMNH 98.4.2.2, 1898.11.8.1-.2, 1921.4.1.187, 1929.4.26.4; CAS 98890; FMNH 73815; KU 50509-11; MCZ R-29506, R-20302-03; MTKD 17107, 22274-75, 34593; NMBA #; NMW 29373.5, 29375; RMNH 4749, 14911.1-.2; SMF 42960, 52864-67, 70535; UF 43900, 111443; UMMZ 65138-50; USNM 70363, 71480, 72322-23, 79454, 104335; UMNH 10264-72; ZMH R401-11, R4005-07; ZMUC R2505-06, R25233; ZRC 2.72; ZSM 17/1956.1-.12, 22/1919, 55/1956.1-.3, 807/20; Bocourt, 1866; Flower, 1899; Smith, 1916, 1931; Cochran, 1930; Taylor, 1970
			Bung Boraped, Nakhon Sawan Prov.	15.670 100.243	CUB 1998.04.05.1
			central Thailand	N/A	Smith, 1916
			Chai Nat, Chai Nat Prov.	15.183 100.133	Thirakhupt and van Dijk, 1994

Table 1 (cont'd)

Species	Watershed	Country	Specific Locality	Latitude/ Longitude	Reference
			Chiang Mai, Chiang Mai Prov.	18.800 98.983	FMNH 171928, 190336-42; KU 50512-14; MCZ R-43083; MTKD 17098; RMNH 10374.1-.6; USNM 101580; Taylor, 1970
			48 km N Chiang Mai, Chiang Mai Prov.	N/A	USNM 102994
			Chom Thong, Chiang Mai Prov.	18.417 98.733	USNM 79499
			Chon Buri, Chon Buri Prov.	13.400 100.983	Taylor, 1970
			Dang Phraya Fai Mts.	N/A	NMW 1322, 29374.2-.3
			Huai Kasang (creek), 1 km S Ban Phu Toel, Phetchabun Prov.	15.566 101.063	UF 69380
			Klong Dam village, Samut Prakan Prov.	N/A	CAS 119939
			Klong Mae Wong, near Klong Larn National Park, Kamphaeng Phet or Tak Prov.	N/A	Thirakhupt and van Dijk, 1994
			Klong Mae Wong, Nakhon Sawan Prov. (ccordinates for prov-ince)	15.700 100.083	CUB 1992.07.04.6
			Lat Yao, Nakhon Sawan Prov.	15.750 99.800	Peter Paul van Dijk, pers. com.
			Lop Buri, Lop Buri Prov.	14.817 100.617	UMMZ 189186-87
			Nakhon Sawan, Nakhon Sawan Prov.	15.683 100.117	Thirakhupt and van Dijk, 1994
			30-35 km WNW Nakhon Sawan, Nakhon Sawan Prov.	N/A	Thirakhupt and van Dijk, 1994
			Phitsanulok, Phitsanulok Prov.	16.833 100.250	RMNH 25716
			Ping River	N/A	Thirakhupt and van Dijk, 1994
			Rangsit Area (Klong 7), Thanyaburi, Pathum Thani Prov.	14.017 100.733	CUB 1992.11.10.1-.2, 1999.01.05.15-.18; Srinarumol, 1995; van Dijk and Thirakhupt, in press
			8 km N Sara Buri, Saraburi Prov.	14.533 100.883	UF 69136
			Saraburi Prov.	14.700 100.867	MNHN 7962
			Sing Buri, Sing Buri Prov.	14.933 100.350	ZMH R3848
			Uthai Thani, Uthai Thani Prov.	15.367 100.050	Thirakhupt and van Dijk, 1994

Table 1 (cont'd)

Species	Watershed	Country	Specific Locality	Latitude/ Longitude	Reference
	Mae Klong	Thailand	Kanchanaburi, Kanchanaburi Prov.	14.033 99.533	Thirakhupt and van Dijk, 1994
			Mae Khlong basin	N/A	Thirakhupt and van Dijk, 1997
			Ratchaburi Prov.	13.533 99.800	Thirakhupt and van Dijk, 1994
			Samut Songkhram Prov.	13.400 100.00	Thirakhupt and van Dijk, 1994; Hutasingh, 1998
			Tharang District, Phetchaburi Prov.	12.750 99.583	CUB 1999.01.05.1-.14; Srinarumol, 1995; van Dijk and Thirakhupt, in press
	Malay Peninsula	Malaysia	east coast *Melaleuca* swamps in Terengganu and possibly Kelantan (Jambu Bongkok Forest Reserve, Terengganu)	4.917 103.350	Sharma and Tisen, 2000
			northern state of Kedah	6.000 100.667	Lim and Das, 1999; Sharma and Tisen, 2000; van Dijk and Thirakhupt, in press
			northern state of Perlis	6.500 100.250	Lim and Das, 1999; Sharma and Tisen, 2000; van Dijk and Thirakhupt, in press
			northern part of peninsular Malaysia	N/A	Bourret, 1941; Ernst et al., 2000; Sharma, 1999
			peninsular Malaysia	N/A	KUZ 36800-01
			N/A	N/A	MSN 6; Nutaphand, 1979; van Dijk, 2000
	Malay Peninsula	Thailand	Krabi, Krabi prov.	8.067 98.917	Mudde, 1991
			lower reaches of Pattani River, Pattani Prov.	N/A	BMNH 1903.4.13.1; Boulenger, 1903, 1912
			Pattani, Pattani Prov.	6.833 101.333	Taylor, 1970
			peninsular Thailand	N/A	Smith, 1916; van Dijk and Thirakhupt, in press
			lower reaches of Phatthalung River, Phatthalung Prov.	N/A	Annandale, 1916
			Phatthalung, Phatthalung Prov.	7.617 100.083	Laidlaw, 1901
			Trang, Trang Prov.	7.500 99.300	USNM 22951, 23111
			Yala, Yala Prov.	6.667 101.167	Laidlaw, 1901; Molluscan Pictures.com: Trip Report, 2003 (with photo record)
	Malay Peninsula	N/A	Malay Peninsula	N/A	UF 85286; Siebenrock, 1909; de Rooij, 1915; Mertens and Wermuth, 1955; Wermuth and Mertens, 1961, 1977;
			northern part of Malay Peninsula	N/A	Smith, 1931; Pritchard, 1979

Table 1 (cont'd)

Species	Watershed	Country	Specific Locality	Latitude/ Longitude	Reference
	SE Coastal Area of Thailand	Thailand	Laem Sing, Chanthaburi Prov.	12.483 102.067	USNM 72212
	N/A	Thailand	N/A	N/A	AMNH R-80924; BMNH #, 59.7.8.4-.5, 59.7.8.7, 78.2.14.8; CRI 2760; FMNH 17915-16, 17926-27; LACM 8115; MCZ R-29504, R-55149; MHNG 1531.55-.73; MTKD 3694-95, 9054, 11111-13, 35034; NMW 29374.2-.3; RMNH 25716; SMF 7531, 56091; UF 68969, 85203; UMMZ 128404; Gray, 1859, 1861, 1869, 1870; Günther, 1864; Boulenger, 1889, 1912; Flower, 1899; Siebenrock, 1903, 1909; de Rooij, 1915; Smith, 1931; Bourret, 1941; Mertens and Wermuth, 1955; Wermuth and Mertens, 1961, 1977; Taylor, 1970; Nutaphand, 1979; Pritchard, 1979; Ernst and Barbour, 1989; Ernst et al., 2000; Touch Seang Tana et al., 2000; van Dijk, 2000; van Dijk and Palasuwan, 2000; van Dijk and Thirakhupt, in press
M. subtrijuga	Mekong	Cambodia	Chay Reap Village (west bank of Sre Ambel River), Sre Ambel District, Koh Kong Prov.	11.486 103.783	FMNH 259400; Stuart and Platt, 2004
			Kampong Thom, Kampong Thom Prov.	12.700 104.900	FMNH 259401; Stuart and Platt, 2004
			Phnom Penh Municipality	11.550 104.917	FMNH 259404; Stuart and Platt, 2004
			Prasat Village (Bassac Marshes), Kandal Prov.	11.295 105.144	Stuart and Platt, 2004
			Prek Toal Village (on Tonle Sap), Koh Chivang Commune, Ek Phnom District, Battambang Prov.	13.241 103.659	Stuart and Platt, 2004
			Sary Village (captured in Tonle Sap), Kampong Thom Prov.	12.808 104.737	Stuart and Platt, 2004
			Siem Reap, Siem Reap Prov.	13.367 103.850	FMNH 259402-03; Stuart and Platt. 2004; Kurt Buhlmann, pers. com. (with photo record); Peter Pritchard, pers. com. (with photo record)
			Snoc Tru, Kampong Chhnang Prov.	12.517 104.450	MNHN 1963.746
			N/A	N/A	BMNH 60.8.28.6, 61.4.12.17, 1861.4.12.15; NMW 29374.1; Gray 1861, 1869, 1870; Günther, 1864; Morice, 1875; Tirant, 1885; Boulenger, 1889, 1912; Boettger, 1892; Flower, 1899; Siebenrock, 1903, 1909; de Rooij, 1915; Bourret, 1941; Mertens and Wermuth, 1955; Wermuth and Mertens, 1961, 1977; Ernst and Barbour, 1989; Ernst et al., 2000; Touch Seang Tana et al., 2000; van Dijk, 2000; van Dijk and Thirakhupt, in press
	Mekong	Laos	Ban Chocksavang Village, Khammouane Limestone NBCA, Khammouane Prov.	N/A	FMNH 258888, 259653-54; Stuart and Platt, 2004

Table 1 (cont'd)

Species	Watershed	Country	Specific Locality	Latitude/ Longitude	Reference
			Ban Lak Village, Khammouan Limestone NBCA, Khammouane Prov.	N/A	Stuart, 1998b, 1999
			Ban Nong Soumhoung Village, Dong Khanthung Proposed NBCA, Champasak Prov.	14.283 105.667	Stuart, 1998a, 1999
			Ban Tap Seng Village, Dong Khanthung Proposed NBCA, Mounlapamok District, Champasak Prov.	14.250 105.683	FMNH 255267; Stuart and Platt, 2004
			Ban Thahin Village, Dong Khanthung Proposed NBCA, Mounlapamok District, Champasak Prov.	14.150 105.583	FMNH 255268; Stuart, 1998a, 1999; Stuart and Platt, 2004
			Ban Vieng Village, Khammouan Limestone NBCA, Yommalat District, Khammouan Prov.	17.333 104.950	FMNH 255269; Stuart and Platt, 2004
			Dong Phou Vieng NBCA, Savannakhet Prov.	N/A	Stuart, 1999
			Pakxe, Champasak Prov.	15.117 105.783	Nash, 1997
			Phou Khaokhoay NBCA, Vientiane and Bolikhamxay provinces	N/A	Stuart, 1999
			Vientiane Municipality	17.967 102.600	FMNH 258868; Stuart, 1999; Stuart and Platt, 2004
			Xe Pian NBCA, Champasak and Attopeu provinces	N/A	Stuart, 1999
			N/A	N/A	Ernst et. al., 2000; Stuart et al., 2000; Stuart and Timmins, 2000; Touch Seang Tana et al., 2000; van Dijk, 2000; van Dijk and Thirakhupt, in press
	Mekong	Thailand	Nakhon Ratchasima, Nakhon Ratchasima Prov.	15.000 102.100	CUB 1991.9.1.2
			Sakaerat, Amphoe Pak Thong Chai, Nakhon Ratchasima Prov.	14.717 102.017	CUB 1993.01.16.2, 1993.01.16.9
	Mekong	Vietnam	Ca Mau, Ca Mau Prov.	9.250 105.167	Le Dien Duc and Broad, 1995; Nash, 1997

Table 1 (cont'd)

Species	Watershed	Country	Specific Locality	Latitude/ Longitude	Reference
			Can Tho Prov.	10.033 105.783	Le Dien Duc and Broad, 1994, 1995
			Ho Chi Minh City, Ho Chi Minh Prov.	10.750 106.667	MTKD 18811, 22525, 26087; ZRC 2.2592; Siebenrock, 1903; Smith, 1931; van Dijk and Thirakhupt, in press; Peter Pritchard, pers. com.
			Long Xuyen, An Giang Prov.	10.383 105.417	BMNH 1920.1.20, 2544-45
			Mekong Delta, southern Vietnam	N/A	MTKD 23937
			Nam Can, Ca Mau Prov.	8.683 104.933	Le Dien Duc and Broad, 1994, 1995
			Phung Hiep, Can Tho Prov.	9.812 105.820	ROM 37057-66
			Rach Gia, Kien Giang Prov.	9.917 105.083	Le Dien Duc and Broad, 1994, 1995
			southern Vietnam	N/A	Morice, 1875; Siebenrock, 1909; Boulenger 1912; de Rooij, 1915; Smith, 1931; Bourret, 1939, 1941; Mertens and Wermuth, 1955; Wermuth and Mertens, 1961, 1977; Pritchard, 1979; Ernst and Barbour, 1989; Geissler and Jungnickel, 1989; Ernst et al., 2000; Hendrie, 2000; van Dijk and Thirakhupt, in press
			U Minh Region, Ca Mau and Rach Gia provinces	9.467 105.033	Le Dien Duc and Broad, 1994, 1995
			U Minh Thuong Nature Preserve, Kien Giang Prov.	9.600 105.083	Safford et al., 1998; Turtle Conservation and Ecology Project, 2001
			U Minh Thuong Nature Preserve, An Minh District, Kien Giang Prov. (flooded field)	9.625 105.133	FMNH 259394; Stuart and Platt, 2004
			U Minh Thuong Nature Preserve, Vinh Thuang District, Kien Giang Prov. (flooded field)	9.544 105.086	FMNH 259075; Stuart and Platt, 2004
			N/A	N/A	CRI 3231, 3276, 3442-51, 3703, 3807-08, 3850-54, 4077; NMW 29373.3; Touch Seang Tana et al., 2000; van Dijk, 2000; William McCord, pers. com.
	Java	Indonesia, Java	Bantam Prov. (former residency in western Java)	N/A	RMNH 6082, 6084-85; Schlegel and Müller, 1844; Hubrecht, 1881
			Banten, Banten Prov.	-6.000 106.150	MZB; de Rooij, 1915
			Cirebon, Jawa Barat Prov.	-6.767 108.550	Kopstein, 1938
			Depok, Jawa Barat Prov.	-6.367 106.750	MCZ R-7819; USNM 43870-71, 44121-22; Barbour, 1912; de Rooij, 1915

Table 1 (cont'd)

Species	Watershed	Country	Specific Locality	Latitude/ Longitude	Reference
			Duri, Jakarta Raya Prov.	-6.183 106.77	de Rooij, 1915
			Jakarta, Jakarta Raya Prov.	-6.133 106.750	BMNH 63.12.4.38, 71.4.10.2; MNHN 1905.57; MZB ; NMW 29373.4; RH 33, 140-44; RMNH 28045; SMF 52792, 58097; ZMUC R25229-32; Gray 1871, 1873; de Rooij, 1915
			Surabaya, Jawa Timur Prov.	-7.233 112.750	ZMH R399-400, R3088
			Tasikmalaya, Jawa Barat Prov.	-7.333 108.267	MZB
			west Java	N/A	RMNH 22213
			N/A	N/A	NMW 1722, 29371.1-.4; RMNH 94; SMF 7532-35; ZMZ 824-26; ZSM 2/1949; Bleeker, 1857; Blyth, 1863; Gray, 1870; Boulenger, 1889, 1912; Flower, 1899; Siebenrock, 1903, 1909; Dammerman, 1929; Lindholm, 1931; Smith, 1931; Bourret, 1941; Mertens and Wermuth, 1955; Wermuth and Mertens, 1961, 1977; Nutaphand, 1979; Pritchard, 1979; Ernst and Barbour, 1989; Whitten and McCarthy, 1993; Ernst et al., 2000; Samedi and Iskandar, 2000; van Dijk and Thirakhupt, in press
	N/A	Indonesia	N/A	N/A	NMBE 44a/14; RMNH 3960; van Dijk, 2000
M. macrocephala & *subtrijuga* (mixed)	Sumatra	Indonesia, Sumatra	Duri, Riau Prov.	1.450 101.250	MZB; Iverson, 1992
			N/A	N/A	NMW 29376.1-.4; Samedi and Iskandar, 2000
Malayemys sp. (unknown)	Northern Vietnam	Vietnam	Hanoi	N/A	Le Dien Duc and Broad, 1994, 1995
			Mon Cai	N/A	Le Dien Duc and Broad, 1994, 1995
			Lang Son	N/A	Le Dien Duc and Broad, 1994, 1995
	Southern China	China	Guangzhou	N/A	Farkas and Sasvári, 1992; Kuchling, 1995; Artner and Hofer, 2001
			Shenzhen	N/A	Kuchling, 1995

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