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Conservation Status of the Euphrates Softshell Turtle, *Rafetus euphraticus*, in Iran

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ABSTRACT. – The Euphrates softshell turtle, *Rafetus euphraticus,* is one of the least known species of the Trionychidae. It is found only in the Euphrates and Tigris rivers and their tributaries in Iran, Turkey, Syria, and Iraq. Its range in Iran is limited to Khuzestan Province. In the course of this study (February 2002–June 2005), 16 visits were made to habitats of the species along the Karkheh, Dez, and Karoon rivers and their tributaries in Khuzestan. During these visits 25 specimens were observed and habitat characteristics and threat factors were recorded. Habitat destruction, pollution, and fisheries interactions (intentional killing) are the main threats to the survival of this species in Iran.

KEY WORDS. – Reptilia; Testudines; Trionychidae; *Rafetus euphraticus*; Mesopotamia; endangered; distribution; habitat; Khuzestan; Iran

Turtles are indisputably valuable components of many freshwater habitats, not only constituting a significant proportion of the faunal biomass but also by serving in food-web roles as herbivores, carnivores, scavengers, and prey (Iverson 1982; Congdon et al. 1986; Congdon and Gibbons 1989). Three species of freshwater turtles occur in Iran: the Caspian pond turtle (*Mauremys caspica*), the European pond turtle (*Emys orbicularis*), and the Euphrates softshell turtle (*Rafetus euphraticus*). However, the turtles of Iran have received scant scientific attention and little is known about their distribution and status (Pritchard 1967, 1979; Ghaffari 2002). Such information is essential for planning effective conservation and resource management strategies.

The Euphrates softshell turtle (*Rafetus euphraticus* Daudin, 1802) is a medium-sized trionychid turtle with a geographic range confined to the Euphrates and Tigris basins of Turkey, Syria, Iraq, and Iran (Taskavak and Atatur 1995, 1998). Its range in Iran is limited to Khuzestan Province in the southwest of the country.

Freshwater turtles face numerous threats, some unquantified but nevertheless real, such as destruction and fragmentation of habitat, as well as pollution (Roosenburg et al. 1997; Wood and Herlands 1997; Hoyle and Gibbons 2000). *Rafetus euphraticus* is probably the most threatened freshwater turtle in Iran. We have investigated the distribution, suitable habitats, and the conservation status of *R. euphraticus* in Iran.

METHODS

In order to determine the occurrence of the Euphrates softshell turtle, we visited 11 different localities (Table 1) in Khuzestan Province of southwestern Iran between 2002 and 2005 (Figs. 1 and 2). In addition to the field surveys documenting the existence of *R. euphraticus* in various habitats, habitat characteristics (temperature, vegetation, pH, drainage, and wildlife) were also taken into consideration. Morphometric characteristics of 5 captured specimens (Fig. 3) were measured with calipers (to 1 mm). Eggs were also measured (to 0.01 mm) and weighed (to 0.01 g) before incubating. For measurement points and morphometric variables we followed the protocol described by Taskavak (1998). Specimens were captured with baited fishing lines (using poultry intestines as bait). Sexes were not determined.

Habitat Rankings

We selected sediment type, water quality, current (m^3/s), pH, and threat factors in different stations as indices of *R. euphraticus* status and investigated each to identify suitable habitats for the species. Habitat characteristics were investigated and habitats were ranked from 1 (poor) to 4 (excellent) based on these factors (Table 2).

Sediment Type. — Sediment types were ranked based on nesting site suitability (4 = fine-grained alluvial soil; 3 = large-grained alluvial soil; 2 = sand and stone; 1 = boulders).

Water Quality. — Water quality was ranked based on pollutant sources discharging into the river (4 = without pollution; 3 = domestic discharge; 2 = industrial discharge; 1 = domestic and industrial discharge). For this ranking, we investigated the source of pollutants (factories and local people that released waste into the rivers) in addition to information obtained from the Khuzestan Water and Waste Water Organization.

Current (m^3/s). — Softshell turtles are rarely seen in fast-flowing sections of the river. Thus, we ranked current based on the nature of the flow [4 = stagnant (0–5 m^3/s); 3 = slow (5–500 m^3/s); 2 = fast (500-2000 m^3/s); 1 = very fast (2000–3500 m^3/s)].

Table 1. River basins and stations investigated in Khuzestan Province, Iran.

River	Station
Karoon	Ahvaz
Shahoor	Shahoor bridge
Dez	TalehZang
Dez	Dezful
Balarood	Dokooheh
Kahak	Zoor Abad
Dez	Harmaleh
Dez	Bamdej
Karkheh	Piepol
Karkheh	Abdolkhan
Karkheh	Hamidieh

Figure 1. Location of Khuzestan Province and Iran in the Middle East.

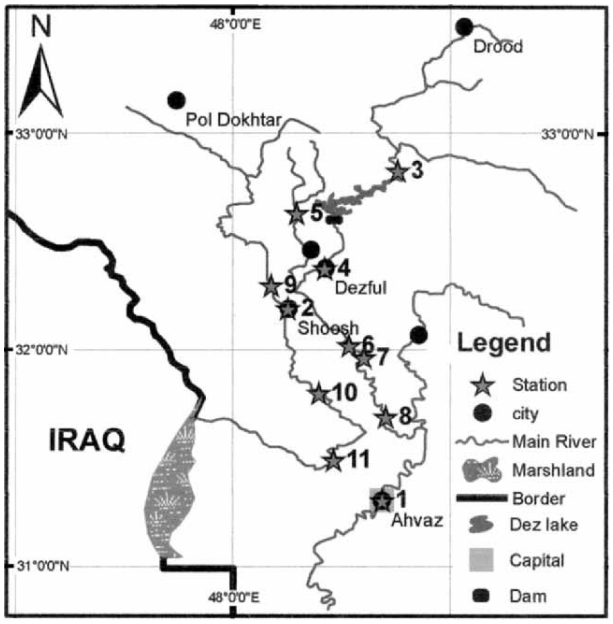

Figure 2. Location of study area in Khuzestan Province, Iran, showing investigated stations.

pH. — We ranked pH of the water at each station as follows: (4 = 6–7; 3 = 7–8; 2 = 8–9; 1 = 5–6).

Threat Factors. — We ranked threat factors, which included presence of fishermen and nets, periodic fluctuations of the water level in probable nesting sites, and pollution and toxic substances that could promote water-based disease (such as malaria).

Figure 3. Adult *Rafetus euphraticus* that was caught in the Dez River, Khuzestan, Iran, March 2005. Photo by Hanyeh Ghaffari.

Study Site

Khuzestan is one of the 30 provinces in Iran, located in the southwest, adjacent to Iraq, and its area is 6.3 million ha. The east and north of the province are bordered by the Zagros Mountains running from northwest to southeast, and to the south is the Persian Gulf. The main rivers in the province are the Karoon, Dez, and Karkheh, flowing from the east; all of them join the Tigris–Euphrates before entering the Persian Gulf (Figs. 2, 4, and 5).

The Karoon River enters the province from the northern plain of Shushtar, passing Ahvaz, the capital of the province, to Abadan and it joins the Tigris–Euphrates at Shat-al-Arab before entering the Persian Gulf (Fig. 2). The Dez River enters the province from the northern plain of Dezful flowing to the southeast and connecting to the Karoon River in Band-e-Ghir. The Karkheh River flows in the far west towards the south of the Shush, where it changes direction to the west. It changes its direction again at 40 km north of Ahvaz as it enters Iraq and joins the Tigris–Euphrates (Fig. 2). Parallel to the Karkheh River, the small Shahoor River flows southwards in the Khuzestan plain, which is a western tributary of the Karoon. The River Dez flows further southwards joining the Karoon River. After draining the northern lowland of Andimeshk, the Balarood River reaches the Dez River (Fig. 4). The length of Balarood River from its source to reach the Dez River is 100 km.

In Khuzestan 3 main areas were investigated for *R. euphraticus* habitat. These 3 areas were as follows: 1) Karkheh River (in the range of Karkheh Protected Area and Wildlife Refuge), 2) Dez River (in the range of Dez Protected Area and Wildlife Refuge), and 3) Karoon River (within the Ahvaz city limits). Eleven stations were chosen

Table 2. Rankings of sediment type, water quality, discharge, pH, and threat factors at different stations in Khuzestan Province, Iran.

	Abiotic factors[a]					
Stations	Sediment	Water quality	Water flow	pH	Threat factors	Habitat index (mean)
Ahvaz	4	1	2	3	2	2.4
Shahoor bridge	4	4	4	4	4	4.0
TalehZang	4	2	3	3	3	3.0
Dezful	4	3	3	3	3	3.2
Dokooheh	4	4	3	4	3	3.6
Zoor Abad	3	3	3	3	3	3.0
Harmaleh	3	3	4	4	3	3.4
Bamdej	3	3	4	4	3	3.4
Piepol	3	2	4	2	2	2.6
Abdolkhan	2	4	3	3	4	3.2
Hamidieh	4	4	3	3	4	3.6

[a] From 1 to 4; poor to good.

in order to investigate habitat characteristics, as well as the occurrence of *R. euphraticus* in these 3 main habitats (Fig. 2).

Dez Protected Region (Protected Area 18,711 ha and Wildlife Refuge 6127 ha; located at 31°35′ to 32°15′N and 48°51′ to 48°22′E) was established in 1967. A proposal to create a wildlife park on the Dez was approved in early 1969, and the park was established in 1970. Similarly, Karkheh Protected Region (Protected Area 10,763 ha and Wildlife Refuge 5422 ha; located at 32°57' to 31°36′N and 48°32′E) was established in 1960 and a wildlife park in 1970. These sites consist of 2 noncontiguous areas along the Dez and Karkheh rivers. Both rivers are deep and wide and meander considerably.

The headwaters of the Karoon River are in the mountain cluster Zard Kuh in Isfahan. In its upper course, until it reaches Shushtar, it is called Ab-e-Kuhrang. From the junction of the 2 principal sources in the Zard Kuh, the Ab-e-Kuhrang is a powerful stream, full, deep, and flowing with great velocity for most of its upper course between precipices. In general, the steepness and height of its banks make it useless for irrigation purposes. From its principal sources to Shushtar the straight distance is only about 75 km, but the course of the river is so tortuous that it travels 250 km before it reaches that city. Besides being fed on its journey through the Bakhtiari country by many mountainside streams, it receives various tributaries, the most important being the Ab-e-Bazuft from the east and the Ab-e-Barz from the west. At Shushtar it divides into 2 branches: Gerger (an artificial channel cut long ago and flowing east of the city) and Shutait (flowing west). These 2 branches, which are navigable to within a few kilometers below Shushtar, unite after Band-e-Ghir, 60 km south of Shushtar, and there are also joined by the Dezful River. From Band-e-Ghir to a point 2 miles above Muhamrah the river is called Karoon and is navigable all the way with the exception of about 2 miles at Ahvaz, where a series of cliffs and rocky shelves cross the river and cause rapids. A major city that is close to the river is Ahvaz, where the Karoon River has divided the city into western and eastern parts.

Figure 4. One of the tributaries of the Dez River, Khuzestan, Iran. Photo by Barbod Safaee Mahroo.

Climate

The climate of Khuzestan is generally hot and humid, particularly in the south. The mean diurnal ambient temperatures (Anonymous 2006) from February 2002 to June 2005 were between 19.1°C and 33.7°C (minimum 7.9°C in January 2002 and maximum 47.1°C in August 2003).

The province of Khuzestan can be basically divided into 2 regions (i.e., the plain [the south and west of the province] and mountainous regions [the north and east of the province]). The plains are irrigated by the Karoon, Karkheh, and Jarahi rivers. The mountainous region is considered to be the southern extreme of the Zagros mountain ranges. In the elevated and mountainous regions of the province, a moderate summer and cold winter are experienced, but in the foothills of the mountains semidesert conditions prevail. In the plains and lower regions to the south and southeast, a variable climate ranging from semidesert to coastal desert predominates.

Figure 5. The junction of the Karkheh and Ojaireb rivers, Khuzestan, Iran. Photo by Hanyeh Ghaffari.

Thus this region experiences long, warm summers and short, moderate winters.

RESULTS AND DISCUSSION

During the field surveys, 25 turtles were observed. Five were captured alive in order to measure morphometric characteristics.

Most specimens were observed in the vicinity of Dez River and its tributaries, demonstrating the good condition of this habitat in comparison with other habitats in Iran (Fig. 4). The Dez River has alluvial soil and sandy banks that are suitable for nesting. Furthermore, the calm waters of Dez River and its tributaries such as Balarood create favorable conditions for *R. euphraticus.* According to Taskavak and Atatur (1998), *R. euphraticus* prefer shallow, relatively calm water with access to basking areas; our findings support these views. The main vegetation in the vicinity of Dez River consists of *Tamarix* sp., *Populus euphratica, Lyceium depressum, Vitex pseudo negundo*, *Salix* sp., *Capparis spinosa, Prosopis stephaniana,* and *Calotropis procera*. Fish in Dez River and its tributaries include *Barbus grypus, Barbus sharpeyi, Barbus kersin, Barbus luteus, Chalcalbrnus* sp.*,* and *Cyprinus carpio*.

Karkheh River is secondary habitat for *R. euphraticus* (Fig. 5). In some areas the shore has hard soil with various-sized stones. In the other areas, the shore has alluvial soil, which is suitable for nesting of *R. euphraticus*. *Tamarix* dominates along the Karkheh River; most of the trees are *Tamarix* and *Populus euphratica* in the limits of Karkheh Protected Area. Likewise fishes in Karkheh River are the same as Dez River, including mostly *Barbus grypus, Barbus sharpeyi,* and *Barbus kersin*.

The Karoon River in Ahvaz city was the other study area. Based on field surveys as well as *R. euphraticus* biological requirements, the investigated sections of the Karoon River do not offer suitable environments for this species. Large amounts of waste water are released directly into the river. Based on interviews with local inhabitants and fishermen in Ahvaz, this habitat was a good area for *R. euphraticus* a few years ago. Most of them affirmed they had frequently seen this species along the Karoon. Furthermore, the river basin and also sand islets were formed by alluvial soil, so it could be a suitable place for nesting. However, because of the pollution, which is evident in this area, not a single observation of the species was recorded by us during our 3.5 years of fieldwork in the Ahvaz city section of the Karoon River. Seasonal floods of the Karoon River may also destroy probable nesting grounds near the riverside. Although we do not have any *R. euphraticus* records, the area still offers the characteristics of potential nesting grounds. Throughout our entire fieldwork, *Mauremys caspica* was present in all suitable localities.

In most of the rivers of Khuzestan, fishing is done by small nets or line fishing. Based on the fieldwork in Turkey, the Euphrates softshell turtle is primarily diurnal, although almost 30% of the specimens were caught during the night (Taskavak 1992; Taskavak and Atatur 1995, 1998).

It has been suggested that the species is more abundant in autumn than in spring (Lortet 1883, 1887; Bodenheimer 1944; Basoglu and Baran 1977). During fieldwork from April to October in Turkey, abundance was quite seasonal (Taskavak 1992; Taskavak and Atatur 1995, 1998). Based on our own fieldwork, most of the specimens were observed during spring.

Morphology

Morphological features of the 5 specimens we captured during our study are given in Table 3. The carapace is smooth and peripherally thick and fleshy in adult *R. euphraticus*. The outlines and sutures of the bony disc are easily discernible from above. In some specimens (usually large adults), a slight vertebral depression is present. The ground color of the carapace is uniformly olive-green with some irregular cream-colored spots, especially on the lateral margins. Larger and more abundant spots are visible on the head. Occasionally, the ground coloration of the whole dorsum is uniformly brown instead of the usual olive-green. The lateral septal ridges (or septal papillae) have small longitudinal troughs with sharp edges (Taskavak and Atatur 1995; Taskavak 1998).

Adult *R. euphraticus* are flattened and dorsally compressed. Carapace length measurements given in the literature range from 420 mm (Basoglu and Baran 1972) to 535 mm (Duméril and Bibron 1835). The largest specimen captured by Taskavak (1992) had a straight carapace length of 680 mm. Among our Iranian specimens, maximum straight carapace length was 520 mm (Table 3).

According to Lortet (1883), Basoglu and Baran (1977), Griehl (1981), and Gramentz (1991) nesting and egg laying occur towards the end of April to early June. One of our specimens (straight carapace length of 355

Table 3. Morphometric measurements (in mm) of 5 captured specimens.

Measured characters[a]	Specimens				
	1	2	3	4	5
CL	355.0	280.0	440.0	520.0	430.0
CW	250.0	220.0	295.0	360.0	280.0
HW	49.0	46.0	65.0	83.1	59.1
PGCW	180.0	180.0	270.0	305.0	280.0
SW	12.0	11.0	14.0	17.2	14.7
ID	14.5	16.0	23.0	30.2	26.6
PW	235.0	200.0	280.0	320.0	260.0
PL	280.0	220.0	340.0	410.0	310.0
RL	36.6	24.0	32.0	41.0	34.2
SL	9.7	9.0	11.0	8.0	12.1

[a] Abbreviations: plastron length (PL), plastron width (PW), carapace length (CL), carapace width (CW), plane of greatest carapace width (PGCW), head width (HW), interorbital distance (ID), snout width (SW), snout length (SL), rostrum length (RL). Definitions as per Taskavak (1998).

mm) captured in the Looreh River on 22 May 2005 laid 5 eggs on 2 June 2005 in captivity. Based on the observation of several small juveniles (probably post-hatchlings; 15 September 1988; Habes Creek) at the tributaries of Euphrates River, Taskavak and Atatur (1998) also claimed that egg laying occurs during the spring months. These 5 brittle-shelled eggs were approximately spherical with a mean diameter of 28.7 mm (range 28.2–29.2 mm). The mean egg weight was 14.1 g. None of them hatched. The mean diameter was somewhat larger than that given by Taskavak and Atatur (1998) for 19 fully developed eggs dissected out from 2 female specimens (23.3 ± 0.13 mm).

Based on the criteria used for determining sexual maturity (i.e., in males, the size and condition of testes and appearance of vasa deferentia; in females, the presence of oviductal eggs and size of ovarian follicles), Taskavak (1998) determined that the smallest mature female had a carapace length of 320 mm. The female specimen that laid 5 eggs was somewhat larger than the smallest mature female reported by Taskavak (1998); however, it is smaller than the length of mature females examined by Basoglu and Baran (1972) and Gramentz (1991). In their samples the smallest size and the mean were 365 and 382.5 mm, respectively. Our sample size is insufficient to speculate on the dimensions reached by mature females in Iran.

Conservation

The Euphrates softshell turtle has been listed by International Union for Conservation of Nature and Natural Resources in the "Red List of Threatened Species" as Endangered (EN A1ac+2c; Anonymous 2008).

The greatest single threat to this species in Iran is habitat destruction. In Khuzestan Province, industrial development causes ever-increasing pollution of the water sources. Wastes discharged into the Karoon, Dez, and Karkheh Rivers and their tributaries have caused the worst habitat loss.

Local fishermen believe this species to be a competitor for fish, and it is often killed for this reason. Also, those turtles that escape from fishing lines may retain the hook inside their throats, causing eventual mortality. One of the specimens that we obtained from a fisherman had an old hook deep in its throat. Similarly, Taskavak and Atatur (1998) reported that a large specimen was captured by hook and line and released by cutting the line. In general, local people are hostile towards the softshell, and incidentally hooked specimens do not usually escape with their lives.

One of the threats of concern is the potential introduction and establishment of *Pelodiscus sinensis* as an invasive species. In Iran, *P. sinensis* hatchlings are sold in pet stores in Tehran and also in Ahvaz city. Thus it is quite likely that area residents, few of whom were familiar with the Euphrates softshell turtle, may release unwanted captive *P. sinensis* into Khuzestan's freshwater habitats. Habits and characteristics of *P. sinensis* are close enough to *R. euphraticus* to cause potential competition. In the pet trade they are explicitly purchased by individuals whose goal is to keep turtles alive and healthy. The majority of these species can become quite aggressive and quickly outgrow most aquariums or outlast the owner's commitment to care for them. As a result, some pet owners unwilling to care for their turtles may release them into nearby bodies of water. This scenario is implicated for invasive introductions elsewhere (Luiselli et al. 1997; Chen and Lue 1998). The impact of introduced turtles on native turtle populations is difficult to assess, but is almost

Table 4. Active plants (factories) that discharge their sewage into the rivers.

Industrial groups	River basins			Total (No.)
	Karoon	Dez	Karkheh	
Food	234	53	9	296
Textile	52	11	8	71
Cellulose industry	47	9	1	57
Chemical	152	54	2	208
Nonmetallic mineral	293	141	22	456
Metal industry	247	53	4	304
Electricity and electronics	19	3	–	22
Total	1044	324	46	1414

certainly negative (Spinks et al. 2003). However, we do not yet have any records of released *P. sinensis* in Iran.

The majority of the water-polluting industries are located in the Karoon River basin followed by the Jarahi and Dez basins. There is not yet any significant industry causing water pollution in the Karkheh basin. Based on research carried out by Jafarzadeh et al. (2004), a quantity of 56,502 tonnes/y of organic load and 26,0186 tonnes/y mineral load from various industries are discharged into the Karoon River. In the Dez River basin, 87,716 tonnes of organic and 93,380 tonnes of inorganic loads from industries are discharged annually. In the Karoon River basin, metal pollution load is greater than in the other basins in Khuzestan, and a major part of this pollution is caused by metal industries concentrated within Ahvaz city limits (Table 4). There is no information about the effect of this pollution on *R. euphraticus* in Iran. However, these pollutants may accumulate in tissues and kill turtles in the long term.

Although freshwater turtles are heavily exploited as a food item in many countries, the meat of this turtle is generally not consumed in Iran. Similarly, Taskavak and Atatur (1998) reported that the local people inhabiting the same region as the Euphrates softshell turtle in southeastern Anatolia do not consume the meat, but a few Armenian families at Diyarbakir are reported to eat softshells.

In addition to these factors endangering the survival of the Euphrates softshell in Iran, we should mention the mechanical destruction of its habitat and the heavy chemical pollution which resulted from the Gulf Wars. Van Dijk (1990) was of the opinion that the species had been negatively affected by the Ataturk Dam in the north, and by the Iran–Iraq War in the south. We also believe the physical and chemical damage inflicted upon the southern parts of the species' range during Gulf War I in 1991 and Gulf War II in 2003 has also been quite serious.

Conclusions

Rafetus euphraticus exists in most rivers and marshes of Khuzestan Province in southwestern Iran. Nevertheless, although no published literature is available to ascertain the conservation status of *R. euphraticus* in Iran, based on our findings given above, *R. euphraticus* in Iran is in jeopardy. Habitat destruction seems to be the major cause of its decline.

The majority of the water-polluting industries are located at the Karoon River, which in the recent past, based on fishermen's reports, was one of the best *R. euphraticus* habitats in Iran. Now, it is the most threatened habitat, the main reason being the high level of pollution of this river, especially within the limits of Ahvaz city. Also, the Kharkheh River, in the range of the Karkheh Protected Area and Wildlife Refuge have heavy pollution that has caused habitat loss.

In the south of Dezful in a narrow creek there is a high density of *R. euphraticus,* but wastewater is released directly into it and is likely to cause problems in the future. If these conditions continue in *R. euphraticus* habitats, it could be devastating.

To ensure the survival of the species, immediate action is required. This should include the following: drafting an action plan for conservation and management; conservation of the most important nesting sites; establishment of undisturbed areas for mating and egg laying; protection against persecution by fishermen (public awareness and education programs); and establishment of measures against drowning in nets.

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LITERATURE CITED

ANONYMOUS. 2006. Meteorological Year Book of Iran (2002–2005). Islamic Republic of Iran Meteorological Organization, Department of Publication, 876 pp.

ANONYMOUS. 2008. European Reptile & Amphibian Specialist Group 1996. *Rafetus euphraticus*. In: 2007 IUCN Red List of Threatened Species. www.iucnredlist.org (24 July 2008).

BASOGLU, M. AND BARAN, I. 1972. A new record of *Trionyx euphraticus* (Trionychidae, Testudines) from Turkey. Scientific Reports of the Faculty of Science, Ege University, Monograph Series 144:1–7.

BASOGLU, M. AND BARAN, I. 1977. The reptiles of Turkey. Part 1. The turtles and lizards. Ege Universitesi Fen Fakultesi Kitaplar Serisi 76:1–272.

BODENHEIMER, F.S. 1944. Introduction into the knowledge of the amphibia and reptilia of Turkey. Rev. Fac. Sci. Istanbul, Ser. B 9:1–78.

CHEN, T.H. AND LUE, K.Y. 1998. Ecological notes on feral populations of *Trachemys scripta elegans* in Northern Taiwan. Chelonian Conservation and Biology 3:87–90.

CONGDON, J.D. AND GIBBONS, J.W. 1989. Biomass productivity of turtles in freshwater wetlands: a geographic comparison. In: Sharitz, R.R. and Gibbons, J.W. (Eds.). Freshwater Wetlands and Wildlife. U.S. Dept. of Energy Symp. Ser. No. 61, pp. 583–591.

CONGDON, J.D., GREENE, J.L., AND GIBBONS, J.W. 1986. Biomass of

freshwater turtles: a geographic comparison. American Midland Naturalist 115:165–173.

DUMÉRIL, A.M.C. AND BIBRON, G. 1835. Erpétologie Générale ou Histoire Naturelle Complete des Reptiles. Volume 2. Paris: Libraire Encyclopedique de Roret, 680 pp.

GHAFFARI, H. 2002. Investigation of *Rafetus Euphraticus* in Iran. BSc Project, Azad University, Faculty of Technical and Engineering: Tehran, Iran.

GRAMENTZ, D. 1991. Beobachtungen an der Euphrat-Weichschildkröte *Trionyx euphraticus* (DAUDIN, 1802) in Ost-Anatolien. Salamandra 27(1):1–16.

GRIEHL, K. 1981. Reptilien in Anatolien. Sielmanns Tierwelt, Hamburg, 5 1.24–29.

HOYLE, M.E. AND GIBBONS, J.W. 2000. Use of a marked population of diamondback terrapins (*Malaclemys terrapin*) to determine impacts of recreational crab pots. Chelonian Conservation and Biology 3:735–737.

IVERSON, J.B. 1982. Biomass in turtle populations: a neglected subject. Oecologia 55:69–76.

JAFARZADEH, N., ROSTAMI, S., SEPEHRFAR, K., AND LAHIJANZADEH, A. 2004. Identification of the Water Pollutant Industries in Khuzestan Province. Iranian Journal Environmental Health Science Engineering 1(2):36–42.

LORTET, L. 1883. Poissons et reptiles du lac de Tiberiade et de quelque autres parties de la Syrie. Archives du Museum d'Histoires Naturelle de Lyon, 3, pp. 99–194.

LORTET, L. 1887. Observations sur les tortues terrestres et paludines du bassin de la Mediterranee. Archives du Museum d'Histoires Naturelle de Lyon 4:1–26, 8, Lyon, Tom. IV, pp. 1–26.

LUISELLI, L., CAPULA, M., CAPIZZI, D., FILIPPI, E., JESUS, V.T., AND ANIBALDI, C. 1997. Problems for conservation of pond turtles (*Emys orbicularis*) in Central Italy: is the introduced red-eared turtle (*Trachemys scripta*) a serious threat? Chelonian Conservation and Biology 2:417–419.

PRITCHARD, P.C.H. 1967. Living Turtles of the World. Jersey City, NJ: T.F.H. Publications, 288 pp.

PRITCHARD, P.C.H. 1979. Encyclopedia of Turtles. Neptune, NJ: T.F.H. Publications, 895 pp.

ROOSENBURG, W.M., CRESKO, W., MODESITTE, M., AND ROBBINS, M.B. 1997. Diamondback terrapin (*Malaclemys terrapin*) mortality in crab pots. Conservation Biology 2:1166–1172.

SPINKS, P.Q., PAULY, G.B., CRAYON, J.J., AND SHAFFER, H.B. 2003. Survival of the western pond turtle (*Emys marmorata*) in an urban California environment. Biological Conservation 113: 257–267.

TASKAVAK, E. 1992. Investigation on the morphology and osteology, biotope and distribution in Anatolia of *Rafetus euphraticus*, with some observations on its biology. PhD Dissertation, Ege University, Borneva-Izmir. 177 pp. [In Turkish].

TASKAVAK, E. 1998. Comparative morphology of the Euphrates soft-shelled turtle, *Rafetus euphraticus* (Daudin, 1802; Reptilia, Testudines) in Southeastern Anatolia. Amphibia-Reptilia 19:281–291.

TASKAVAK, E. AND ATATUR, M.K. 1995. Threats to survival of Euphrates soft-shelled turtle (*Rafetus euphraticus*; Daudin, 1802) in Southeastern Anatolia. In: Smith, S.S. and Smith, S.S. (Eds.). International Congress of Chelonian Conservation (6–10 July 1995, France). Proceeding Book, pp. 141–145.

TASKAVAK, E. AND ATATUR, M.K. 1998. Distribution and habitats of the Euphrates softshell turtle, *Rafetus euphraticus,* in Southeastern Anatolia, Turkey, with observations on biology and factors endangering its survival. Chelonian Conservation and Biology 3(1):20–30.

VAN DIJK, P.P. 1990. Softshells and Saddam. Tortoises and Freshwater Turtles [newsletter IUCN/SSCTFTSG] 5:6.

WOOD, R.C. AND HERLANDS, R. 1997. Turtles and tires: the impact of roadkills on northern diamondback terrapin, *Malaclemys terrapin terrapin*, populations on the Cape May Peninsula, southern New Jersey, USA. In: Van Abbema, J. (Ed.). Proceedings: Conservation, Restoration, and Management of Tortoises and Turtles – An International Conference. N.Y. Turtle and Tortoise Society, pp. 46–53.

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