EGYPT

NDF- Egyptian tortoise
(Testudo kleinmanni)

Country– Egypt

Original language– English

# A-CONSERVATION, MANAGEMENT AND CONTROL OF TRADE IN Egyptian tortoise (Testudo kleinmanni) in Egypt

## THE NON-DETRIMENTAL FINDINGS STUDIES (NDF)

**Egyptian management authority**
**Egyptian scientific authorities**
**Department of wildlife**

# Executive Summary

The Egyptian tortoise(Testudo kleinmanni)  is a terrestrial species found in the relatively arid zone along the southeastern coast of the Mediterranean Sea. The species is restricted to a narrow coastal zone in Libya, Egypt, and Israel, and occurs in desert and semi-desert areas, coastal grasslands, the edges of salt lakes or salt marshes, and areas of thorny shrubs. The Egyptian tortoise is the only dwarf tortoise found in the Northern Hemisphere, the second smallest tortoise species in the world, and the least known and most restricted tortoise species in the genus Testudo that inhabits the Mediterranean basin. Its current distribution is highly fragmented due to human and natural influences. Stressors affecting the Egyptian tortoise are similar across the species' range, although the magnitude of stressors may vary. Severe habitat loss and degradation resulting from urban development, agricultural conversion, overgrazing, and military activities affect the Egyptian tortoise throughout its range. Habitat loss and impacts on the species may also occur in the future due to changing environmental conditions from climate change, i.e., increasing temperatures and decreasing rainfall throughout the species' range. Collecting for pet trade has historically been an important factor in Egypt. Egyptian tortoises are not extensively collected in northern Sinai. Some protection is provided to the Egyptian tortoise based on current regulations in Egypt... Protected areas in Egypt in the Zaranik Protected Area provide some protection to Egyptian tortoise habitats from habitat loss and collecting pressure. The IUCN has assessed the conservation status of the Egyptian tortoise as Critically Endangered, indicating an extinction risk of ≥80 percent in the next three generations. To assess the biological status of the Egyptian tortoise, we assessed a range of conditions to allow us to consider the species' resilience, representativeness, and redundancy (collectively, the 3Rs) now and in the future. The Egyptian tortoise needs populations that are resilient enough to withstand unlikely events. The species also needs to replicate multiple resilient populations distributed across its range, and on both sides of the Nile, to withstand catastrophic events. Although we have not identified any

catastrophic events that would affect the species. Conservation of populations west and east of the Nile is essential because representative habitats include some ecological diversity between populations on either side of the river. We assessed the current and future resilience, redundancy, and representativeness of the species using two possible scenarios based on current stressors and population trends. The two scenarios we assessed were: (1) a status quo scenario where stressors and population levels continue on the same trajectory; and (2) a limited collection scenario that may result in a decline in Egyptian tortoise collection for the pet trade.

## A. Taxonomy

**--** Order

The Egyptian tortoise, Testudo kleinmanni[39], is placed in the order of Testudines

-- Family The Egyptian tortoise belongs to the family of Testudinidae

--Genus The genus of the Egyptian tortoise is Testudo.

--Species The genus Testudo consists of five species:

1.Testudo graeca(Spur-thighed tortoise);
2.Testudo hermanni (Hermann's tortoise)
3.Testudo horsfieldii (Horsefield's tortoise);
4.Testudo kleinmanni(Egyptian tortoise);
5.Testudo marginata(Marginated tortoise).

Subspecies

There is no subspecies for the Egyptian tortoise.

Common names

There are several common names of the Egyptian tortoise

1**. Common names of the Egyptian tortoise in Latin, English, French, German, Italian and Spanish (CITES, n.d.).**

| | |
|---|---|
| Scientific name | Testudo kleinmanni |
| English | Kleinmann's tortoise, Egytian tortoise |
| French | Tortue de Kleinmann, Tortue d'Egypte |
| German | Ägyptische Landschildkröte |
| Italian | Testuggine di Kleinmann, Tartaruga egiziana |
| Spanish | Tortuga de Plastrón |

## B.Morphology

1.Measurements

The Egyptian tortoise, Testudo kleinmanni, is the smallest species of the genus Testudo and one of the smallest terrestrial tortoise species of the world, The most obvious and distinguishing characteristic of the Egyptian

tortoise is the small size.
The carapace of the Egyptian tortoise is measured with a vernier caliper the average length of an adult is 100 mm and the weight of an adult is 200 grams.
The average weight of the juveniles is 100 grams. Other measurements are given

Average carapace
length
Females 110 –125 mm 90 –127 mm 125 mm
Males 100 –115 mm 95 mm 100 mm 105 mm

Average weight
Females 300 grams 260 grams 350 grams
Males 150 grams 157 grams 200 grams

Maximum weight
Females 350 –450 grams
Males 160 –215 grams

(Blake& Sherrif & Skelton, 1996; = Bruekers, 1995; = Dathe, 2003; = Grano, 2013; = Highfield & Martin, 2001; = Mendelssohn & Geffen, 1995; = Stettner, 2006.)

**--** The plastron of the females are larger than males this is probably to improve the egg production. The small size of the males could be driven by the accessibility to females and reduced detection by potential predators

Mean PL
Juveniles 64.63 mm
Females 108.24 mm
Males 102.53 mm

Maximum PL
Juveniles 98.44 mm
Females 149.54 mm
Males 124.55 mm (Macale et al., 2009).

The Egyptian tortoise has a rapid juvenile growth phase until an age of eight to ten years followed by a slow and continuous adult growth phase (Macale, Scalici & Venchi, 2009).

2- General description

The differences between the Egyptian tortoise, Testudo kleinmanni, and other Testudo species are clearly demonstrable

The head, neck, limbs, feet, nails, and tail vary from yellow to yellowish-brown to ivory colored (Loveridge and Williams 1957, p. 280; Flower 1933, p. 748; Highfield and Martin 2014, p. 1; Ernst et al.2014, p. 1).

Hatchlings are completely yellow (Loveridge and Williams 1957, p. 279)

The button-like eyes are strikingly black and the irides in both sexes are shiny black and very conspicuous (Loveridge and Williams 1957, p. 280; Flower 1933, p. 748).

The shell (carapace– top shell and plastron– bottom shell) is composed of hard, bone plates covered by scutes (bony plates)made of keratin.

Both parts fused together at the sides by a bridge. The high-domed carapace is pale yellow with lemon and yellow-green shades, with each scute edged with brown or black (Buskirk 1985, p. 36; Loveridge and Williams 1957, p. 279; (Woodland Park Zoo 2014, p. 1).

These marks vary in individuals, regardless of sex or locality; they may be strong and broad, wide or narrow, or merely outlines to the shields (Flower 1933, p. 749; Love ridge and Williams 1957, p. 279; Ernst et al.2014, p. 1).

The centers of the carapacial scutes bear no dark pigment (Buskirk 1985, p. 36).

The Egyptian tortoise usually has much less dark pigment on the carapace than any other Testudo species (Buskirk 1985, p. 36).

The plastron is greenish to yellow (Loveridge and Williams 1957, p. 279).

The vast majority of specimens feature two V-shaped brown or black markings upon the abdominal scutes, which is a symmetrical dark triangular figure with the base being along the abdomino-pectoral seam and the apex toward the tail (Buskirk 1985, p. 36)(see Figure 2b, above).

This feature is quite different from the abdominal marks seen on the plastron of other Palaearctic land-tortoises – Greek tortoise, Hermann's tortoise (Testudohermanni), Marginated tortoise (Testudomarginata), and Russian tortoise (Testudohorsfieldii) (Flower 1933, p. 749; Highfield and Martin 2014, p.

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**--Juveniles**

Hatchling Egyptian tortoise differs from older individuals by their coloring. Hatchlings have a brown-spotted pattern on the carapace which is lost during the course of a few months.

There is an article available of Delfino, Chesi and Fritz (2009) with a more detailed description of shell morphology of the Egyptian tortoise.

## C. Distribution and habitat of T. kleinmanni in Egypt

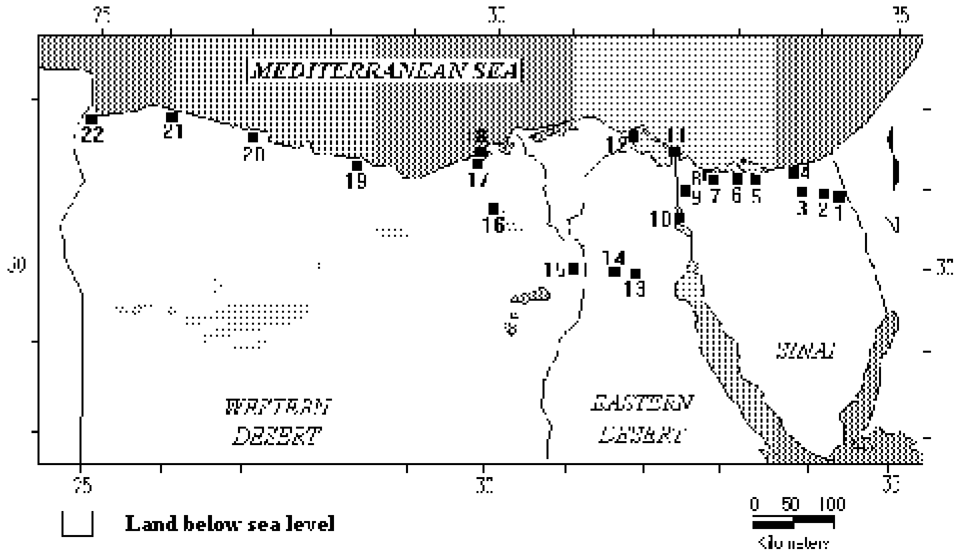
The limited range of the Egyptian tortoises lies within the Mediterranean Basin from Libya through northwestern Egypt (North Coast and North Sinai) to the Negev Desert in Israel (figure).
Egyptian tortoises are usually observed within 60 km or sometimes within 80 or 100 km from the Mediterranean sea
Further inland the climate becomes too dry for this species. Until several years ago, the Egyptian tortoise's range occupied an area over 120.000 km. In 2003 this area did not exceed 16.600 km.
Due to severe pressures and several threats the species has been eradicated from large areas in Egypt.

**There are three more recent records from Egypt; one animal found with a local who claimed to have encountered it outside his home at El Teloul, North Sinai; and the remains of a single animal found in a Brown-necked Raven's nest in a tributary of Wadi Digla, south east of Cairo (Baha El Din 1992). The third record is of a dead animal found by a local at the north end of Wadi El Natrun and presented to Mr. Ahmed Riad (pers. com.) in 1991.**

**The past range of T. kleinmanni in Egypt probably encompassed the whole Mediterranean coastal desert east and west of the Nile Delta within 100km from the sea. The few records of the species further south (Bir Gindali, Wadi Degla and Wadi El Natrun), probably represent remnants of relict populations which became isolated (and probably now extinct) when the landscape became increasingly arid and degraded.**

**In North Sinai T. kleinmanni inhabits soft sand habitats largely dominated by Artemisia monosperma scrub, similar to the habitat occupied by the species in Israel and described by Geffen & Mendelssohn (1988, 1991). However, the species dose not appear to be restricted to these soft sand habitats, as might be inferred from ecological work carried out on the species in Israel, where its range is very small. In other parts of Egypt the species has been recorded from regions with very little soft sand or dunes, or none at all. In fact most of the past records from the North Coast are from areas dominated by compacted sand and gravel plains with scattered rocks and shallow sandy wadis , very different from the dune fields of North Sinai and the western Negev. Flower (1933) reported the species from the North Coast on the top of escarpments inland. The species appears also to inhabit coastal areas adjacent to salt marshes as suggested by individuals**

**reported near the southern margins of Lake Bardawil and east of Salum (see results of survey below).**




**1 Wadi El Amr; 2 Wadi Hareidin; 3 Bir Lahfan; 4 El Arish; 5 El Teloul; 6 Bir El Abd; 7 Katia; 8 Romana; 9 El Qantara; 10 Ismailia; 11 Port Said; 12 Damietta; 13 Bir Gindali; 14 Wadi Digla; 15 Giza; 16 Wadi El Natrun; 17 Maryut; 18 Alexandria; 19 El Daba; 20 Matruh; 21 1.6km south of Sidi Barrani; 22 Salum.**

**Figure. Locality records of Testudo kleinmanni in Egypt. Largely based on Flower (1933); Schmidt & Marx (1956); Marx (1968); Werner (1973); Buskirk (1985) and Baha El Din (1992).**

## Habitat

Large areas of desert, including habitat of the Egyptian tortoise, are usually denuded of plant cover in the vicinity of Bedouin settlements (i.e., nomadic grouping of Arab people who have historically inhabited these desert regions) (Baha El Din 1994, p. 23). Bedouin societies traditionally avoid permanent settlement, preferring portable shelters that allow them the flexibility that their pastoral nomadic way of life requires. The local Bedouin traditional building style uses massive amounts of the woody shrub Artemisia mono sperma in the construction of their semi-permanent settlements (Baha El Din 1994, p. 23). This woody perennial is the dominant plant providing the basic habitat complexity and cover that the tortoise requires (Baha El Din 1994, p. 23). Since the Arab Spring in 2011, grazing is currently much less and the vegetation has recovered because the women no longer feel safe to graze their livestock. However, grazing will likely return to previous levels once the security situation improves (Attum 2020, pers. comm.).

# D. Population

### North Sinai

**North Sinai is characterised by a low lying landscape dominated by extensive aeolian sand dune fields, which extend southwards from the Mediterranean coast to an average of about 50km. The Tina Plain, situated in the north west of North Sinai is a part of the holocene Nile Delta and consists of a vast clay plain bordered to the south by large areas of salt marsh, which merge with the sand dunes further south. Lake Bardawil, situated half way between the Suez Canal and the city of El Arish, is a shallow hypersaline coastal lagoon. The southern shore of the lagoon is fairly complex consisting of numerous inlets, bays, islets (which are often only seasonally disconnected from the mainland), coastal dunes and extensive mud flats and salt marshes. South of Bardawil the landscape consists of rolling sand and partly stabilised dunes and some saline sabkhas dominated by halophytic vegetation in interdune plains. Further south (15-20km) a wide belt of high dunes is found. Most of the dunes here are active and unstabilised, with fairly large interdunes, where fairly dense vegetation is often found. More inland the dunes are replaced by flat gravel and clay plains and wadi desert, with scattered hills and low mountains. Wadi El Arish is one of the most important geographical features of North Sinai, extending for about 250km to the south (Zahran & Willis 1992), draining much of central southern Sinai, and forming extensive fluvial deposits particularly along the lower course of the wadi.To the east of Wadi El Arish the landscape is similar to that of central North Sinai, except that sand dunes are smaller and usually well stabilised with a good cover of vegetation, due to the grater rainfall in this region. The sand dune belt also becomes narrower than further west, extending east into the western Negev in Israel. To the south, the dunes are replaced, rather abruptly, with alluvium carried by wadis draining across the border from Israel into the Wadi El Arish.**

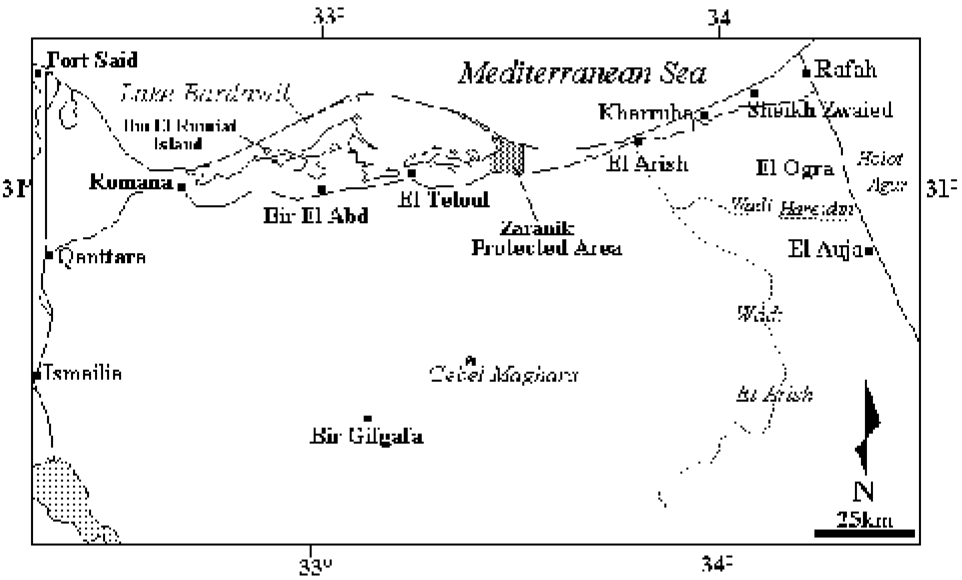


Figure. Map of North Sinai.

Rainfall is generally rather lower than in the North Coast and is restricted to the winter months, with an average of 97mm at El Arish, but rapidly increasing east wards to over 200mm at Rafah. The amount of rainfall decreases very rapidly to the south and west.

Vegetation near the coast is dominated by halophytes, such as Halocnemum strobilaceum and succulents such as Zygophyllum album. Kassas (1955) (in Zahran & Willis 1992), estimated the plant cover of the North Sinai littoral dunes at 5%. The vegetation of the dunes further inland are dominated by Artemisia monosperma and to a lesser extent by the grass Stipagrostis scoparia. These communities are subject to intense human interference by cutting and grazing. In places distant from human settlement, the plant cover may reach up to 70% (Zahran & Willis 1992).

Characteristic reptiles which share T. kleinmanni's habitat in North Sinai include, Stenodactylus petrii; Acanthodactylus scutellatus; A. boskianus; Mesalina olivieri; Trapelus savignyi; Sphenops sepsoides; Chamaeleo chamaeleon; Varanus griseus; Lytorhynchus diadema; Psammophis schokari and Cerastes vipera.

The 1986 human population estimate for North Sinai is 171,500 (Euroconsult 1992). Unlike the highly dispersed settlement pattern in the North Coast, most of North Sinai's population is concentrated in a few fairly large urban centres (largest is the city of El Arish).

## Current status of T. kleinmanni in North Sinai

The only "evidence" obtained that some population or small individuals may still exist is based entirely on oral contacts with local Bedouins.

There is the coastal strip east of El Arish (inland to about 10-35 km). Inland, many locals cited an area called El Agra, directly opposite Holot Agur on the Egyptian side of the border (possibly an extension of the same dune field, hence the similarity in names), as the only area still holding turtles in northeastern Sinai. The habitat appears to have been recently degraded by new peach orchard cultivation, and was heavily grazed. Locals to the south were aware of the species, reporting that they had not seen any specimens in the past ten years, but that they still existed on the other side of the border, and that some animals occasionally wandered into Egypt, where they were found.

West of Wadi El Arish, most locals were aware of the species but had not seen it for many years.

Several individuals claimed to have found animals or traces of them during the spring of 1994 or the previous spring. One local resident claimed that some animals were occasionally found southwest of Zaranik (31°03'N 33°15'E), another claimed to have found traces this spring at Zaranik and another south of the square, although the habitat appeared to be marginally suitable. However, a number of local residents agreed that some animals were still present on the small islands and sandbar that border the southeastern edge of Lake Bardawil, north of Rawdah (31°02'N 33°21'E / 31.02'N 33.02'E / 31.02'E / 31.02'N 33.02'E / 31.02'E / 33.02'E). One claimed to have collected a turtle from that area in the spring of 1993 and kept it as a pet in his nearby home. The animal then escaped into the wild, but from the consensus of the local population and the good habitat available, it seems likely that a small number still exists in this area. This is supported by evidence found by the author in the West in previous years. In the spring of 1985, tracks of T. kleinmanni were found on Umm al-Rumiyyat Island in the west of Lake Bardawil (Bahaa el-Din 1985), and its presence was confirmed by the coast guards present on the islands (who collected the animals). A subsequent visit to the island in 1990 indicated that the species was probably extinct from that island (the largest in Lake Bardawil). In the summer of 1990, a single animal was found with a local resident at al-Tilul (at the south-central margin of Lake Bardawil), who claimed to have found it walking outside his house (Bahaa el-Din 1992). It is likely that very small, highly fragmented and isolated groups or even individuals still exist in isolated patches of habitat among the inland dunes, especially towards the border; To heavy predation, or to be collected by herders. The southern edges of Lake Bardawil appear to be the best remaining habitat for this species and there is evidence that a small and very fragmented population still exists in that area.

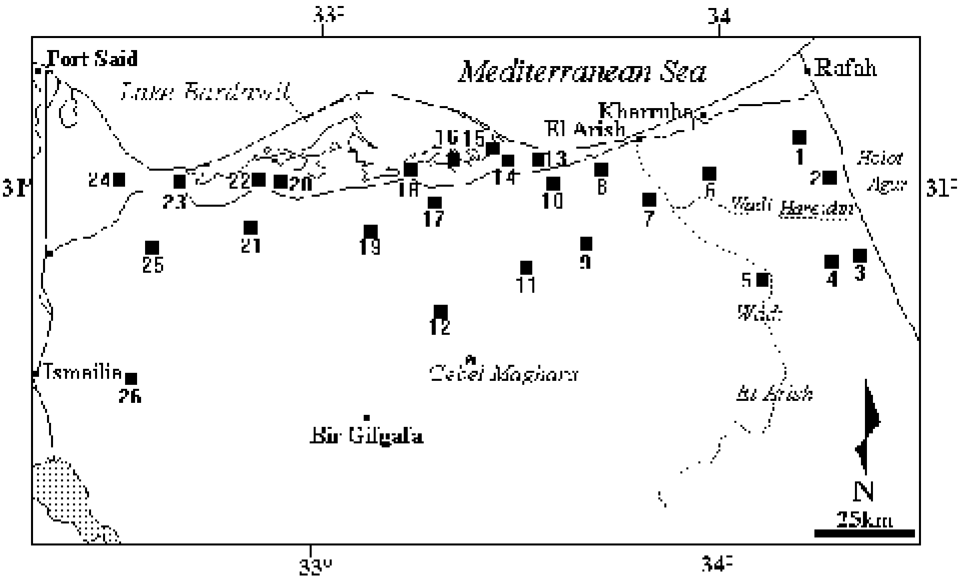


**Figure. Map of the northern coast showing sites visited during the spring of 1994. Numbers refer to the number in Table 2.**

## Population Density

By the end of 1990, the Egyptian tortoise appeared to be technically and physically extinct in Egypt, but in 2000 a small population of the Egyptian tortoise was found in northern Sinai (in the Zaranik Protected Area) at a density of about four to five tortoises per square kilometer. We take into account the historical and current distribution of the Egyptian tortoise, its historical and current population size, and what the species needs to survive. Historical and Current Distribution The Egyptian tortoise is restricted to a narrow coastal zone in North Africa and Israel in the southeastern Mediterranean, and has the most restricted range of all tortoises in the Mediterranean basin and the world (Bahaa El Din 2003, complete). The current range is very fragmented due to human impact on the habitat and natural factors such as low rainfall. The species is generally found near the coast because it cannot tolerate the extremely arid conditions in the interior (Mendelsohn 1982, p. 133). From west to east it ranges eastward across northern Egypt, and in the western and central Negev deserts. Historically, the range of the Egyptian tortoise in the interior of the Mediterranean ranged from 50 to 120 km (37.3–74.6 mi) (Baha El-Din 1994, p. 1; Buskirk 1985, p. 40; Mendelsohn 1982, p. 133; Schneider and Schneider 2008, p. 145; McGrath 2011, unnumbered). The range may have been much larger in the past, with locations further inland, such as individuals reported from the Siwa Oasis, Egypt. However, isolated occurrences of species in the interior may represent human introductions or be exotropic (i.e. outside their natural range) and should be viewed with caution (Perälä 2005, p. 892). Figure 5. Distribution of Egyptian tortoises, from Libya to Israel shaded in red. Yellow dots represent historical and/or current occurrences, and orange dots are assumed to be commercial (Rhodin 2020, personal communication; Rhodin et al. 2017, p. 154).

### Historical and current population size,

density is thought to be very low (Pieh, pers. comm., in IUCN 2014, p. 3 and Perälä 2005, p. 894; Mendelssohn 1982, p. 133). The population in 1982 was estimated at about 10,000 individuals (Mendelssohn 1982, p. 134), and includes the Egyptian tortoise population west of the Nile River and the northern coast of Egypt and east of the Nile River in northern Sinai, Egypt (IUCN 2014, p. 3). However, the 1982 population estimate is likely to be an underestimate based on current numbers and trade statistics

(IUCN 2014, p. 3; Perälä 2005, p. 894). Given the lack of fieldwork data for the Egyptian tortoise, an average population density of 4.5 individuals per square kilometer, based on Mendelssohn's 1982 study, was assumed to apply to Egyptian tortoises throughout their entire range (Perälä 2005, p. 894). This density was used to calculate populations two to three generations ago (30 to 50 years ago) and to calculate current populations in 2005 and 2006 (see table below). In addition, historical and current population sizes were calculated at 10 percent of their range (Perälä 2005, p. 894; Perälä 2006, p. 61; IUCN 2012, in full). This 10% area is defined as the area within its "range" occupied by a species, excluding vagrants. This measure reflects the fact that a species will not typically occur throughout its entire range (IUCN 2012, pp. 12–13). Therefore, based on assumptions, the total historical population has been estimated at 100,680 individuals (see table below). Since the late 1950s, or approximately the last three generations, according to estimates from all known Egyptian tortoise sites on the northern coast of Egypt, the decline in population size west of the Nile has been approximately 85% (Perala 2005, p. 895). Similarly, based on past and present population sizes of Egyptian tortoises in northern Sinai, the decline in population size east of the Nile has been approximately 93% (Perala 2006, p. 61). If we combine all the areas west and east of the Nile where the Egyptian tortoise occurs, the population has declined by about 90% since the 1950s. The population in 2005 and 2006 was estimated at 10,650 individuals (see table below). However, due to the lack of accurate fieldwork-based data on population sizes, an average population density was assumed based on surveys conducted in the early 1980s, and because many known threats and pressures affect populations throughout its range, population estimates may be overestimated (Perälä 2005, p. 895). The Egyptian tortoise is currently present based on the number of Egyptian tortoises in commercial and pet markets (Baha El Din 2020, personal communication). In Egypt, the Egyptian tortoise was present on the northern coast perhaps until the early 1970s but was extinct from large parts of the northern coast by the mid-1970s (Perälä 2005, p. 894; Baha El Din 1994, p. 25. According to its occurrence, the northern coast represented approximately 47 percent of the range of the Egyptian tortoise. In northern Sinai, Egypt, small populations are found

Population Estimate

The total population estimate is approximately 11,000 Egyptian tortoises. No range wide surveys have occurred for this species and is based on the limited available presence/absence data, IUCN

51criteria, and expert opinion. The total population size estimated in 2005 and 2006 is based on extrapolating a population density estimate of 4.5 tortoises per $km^2$that was reported from a small area in Israel in the 1980s. This is a very low density for small tortoises (Mendelssohn 1982, p. 133). Moreover, because no rangewide data exists, the total population size in 2005 and 2006 was calculated relative to an estimated area of occupancydefined as 10 percent of the extent of occurrence. This reflects the fact that a taxon will not usually occur throughout the entirety of its extent of occurrence (Perälä 2005, p. 894; Perälä 2006, p. 61; IUCN 2012, entire)

Current global population trends

___increasing
_X_ decreasing
___ stable
___ unknown

The world population is apparently decreasing due to unsustainable collection from the wild (IUCN, in prep.).
There are currently no export quotas for this species (CITES,).

## E. Threat

**Agricultural Perhaps the most serious threat facing T. kleinmanni is the complete (and possibly irreversible) destruction of habitats caused by agricultural activities. Traditionally, the indigenous people of the northern coast cultivated small areas of rain-fed winter cereals, olives and dates. Today, with population growth and the introduction of modern machinery, almost all arable land that receives enough**

**rainfall to grow a (usually) annual crop of winter cereals is ploughed. The most cultivated areas are those that were the main habitat of T. kleinmanni in the past (as evidenced by pockets of remaining natural .(habitat**

**Modern mechanized ploughing is the most destructive recent development on the agricultural front. In the past, camels, donkeys and simple implements were used for ploughing, which did not allow for the complete eradication of perennial vegetation or the destruction of areas with thick cover or rocky substrate; leaving behind a network of islands of natural vegetation. But modern machinery is indiscriminately and completely removing the perennial shrubs that provide the tortoises with cover and shelter and levelling the landscape, and is penetrating areas that were previously difficult to cultivate with conventional technology; and possibly killing animals in the process. Ploughing takes place during the winter and early spring, depending on the pattern and timing of rainfall. Barley and wheat are the two main crops grown. After the crops are harvested in late spring/early summer, the land remains barren and completely devoid of any vegetation for the rest of the year. This in turn means that grazing pressure has increased dramatically in any remaining pockets of natural habitat, as well as in marginal areas unsuitable for agriculture, further degrading them. Conventional grazing and overgrazing: Unlike the impact of agriculture, which is very easy to notice, even from a great distance (the complete removal of natural vegetation), the impact of grazing is more subtle. Grazing can be devastating to tortoises. Where sheep and goats compete directly with tortoises for the same food resource: annual plants (the main food item for T. kleinmanni). In early spring, when T. kleinmanni activity is at its peak, coinciding with the maximum growth of annual plants, grazing is most intense. Close examination of areas that appeared to be in good condition from a distance revealed that only the dominant woody perennials, which are not heavily grazed by sheep and goats (such as Thymelaea hirusta and Artemisia monosperma), remained,**

**while the annuals were heavily grazed. In fact, in most of the sites visited, very few or no annual plants remained. All sites visited had one or more herds of grazing plants. Signs of heavy overgrazing were seen everywhere. Commercial collection: No evidence of commercial collection of tortoises has been found in the North Coast area at the present time. One animal found with a shepherd in Salloum was brought from Libya. Both professional tortoise collectors (from Abu Rawash) and locals agree that this species is no longer collected from the North Coast area. However, both admit that large numbers were collected in the past, for sale as pets, but very small numbers have been found over the past ten years**

Main threats within the case study country

___ No Threats
**X** Habitat Loss/Degradation (human induced)
___ Invasive alien species (directly affecting the species)
___ Harvesting [hunting/gathering]
**X** Accidental mortality (e.g. Bycatch)
___ Persecution (e.g. Pest control)
___ Pollution (affecting habitat and/or species)
___ Other
___ Unknown

## F. Conservation Status and Use Controls and Monitoring

**International**

**The listing of the Egyptian tortoise on Appendix I (in 1995) of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) was an important conservation measure for this species due to the decline in populations and the amount of trade that occurred until the 1970s and 1980s (Bahaa Eldin 1994, p. 25; Turkuzan et al. 2008, pp. 272–273). Appendix I represents the most endangered species listed in CITES (CITES 2019, n.p.). Species listed on CITES Appendix I are considered to be threatened with extinction, and international trade is permitted only under exceptional circumstances, which generally prohibits commercial trade (CITES 2019, n.p.). The Egyptian tortoise is classified as Critically Endangered on the IUCN Red List of Threatened Species, indicating that the species has a declining population trend and faces**

**a greater than or equal to 80 percent chance of extinction in the wild within three generations due to habitat loss and collection (IUCN 2012, pp. 16–18; Perla 2003, n.d.; Rudin 2020, personal communication).**

**Status of the Egyptian tortoise, Testudo kleinmanni (IUCN, 2003). The status of the Egyptian tortoise has changed over the past years. Status 1982Undetermined (I) 1986Undetermined (I) 1988Endangered (V) 1990Endangered (V) 1994Endangered (V) 1996Endangered (EN) 2001Critical Endangered (CR) 1- In 1997, 300 Egyptian tortoises were seized from Libya from the pet trade. These animals were transferred to the Turtle Conservation Foundation in Egypt in the hope of establishing a conservation programme for this species. 2.. In November 2007, 370 Egyptian tortoises were illegally imported from Libya to Italy, packed in suitcases. The animals were seized by the authorities at the airport. Unfortunately, all of these tortoises died of stomatitis and rhinitis after being confiscated in Italy. 3. Since 2000, breeding programmes have been established under the European Studbook Foundation (ESF) and the European Association of Zoos and Aquariums (EAZA). In North Sinai, in the Zaranik Protected Area, a project for the restoration of the Egyptian tortoise has been established. Linking ex situ breeding programs with an in situ breeding project forms the basis for the restoration and conservation of the Egyptian tortoise in Egypt. The goal in the near future is to develop measures for the restoration programs of the Egyptian tortoise. With the participation of the local population of the tortoise habitat, the Egyptian government and the guarantee colonies of the ESF and EAZA EEP registers, the foundation has been laid for the successful and feasible restoration of this endangered species in the future. The Nature Conservation Sector (NCS) of the Egyptian Environmental Affairs Agency (EEAA) is responsible for nature conservation and the management of protected areas (NCS 2006, p. 3). Law 102 (issued in 1983) provides the legislative framework for the establishment and management of protected areas in Egypt. Under Law 102, it is prohibited to commit acts that lead to the destruction or deterioration of the natural environment or harm living organisms (EEAA 2019, n.d.). The Egyptian tortoise is one of five protected reptiles, which prohibits the export of the species for any purpose (Buskirk 1985, pp. 43-44). Domestic trade is not legal,**

**Law No. 4 in Egypt (issued in 1994) has become the primary legislation for environmental management,. Law No. 4 grants protected status to the Egyptian tortoise; it is illegal to collect,**

possess, or sell protected species or wild animals, dead or alive (Baha El-Din et al. 2003, p. 653). Its enforcement and screening at airports for species listed in the Convention on International Trade in Endangered Species has led to the confiscation of Egyptian tortoises (Baha El-Din et al. 2003, p. 653). Since the issuance of Law 102 (in 1983), 30 protected areas have been declared, two of which (Zaranik Protected Area and El-Amaid Protected Area) are known or recognized for supporting the Egyptian tortoise (Harhash 2012, p. 9; NCS 2006, p. 3). Two areas containing suitable habitats have been proposed for protection (El-Qasr and El-Salloum). Budget allocations for protected areas have been reduced. Consequently, the challenges facing protected areas management in Egypt include human and financial resources.

Besides ex-situ breeding programs, so-called guarantee colonies, there is a pressing need for in-situ protection. For a long time. In Egypt, large numbers of tortoises have been confiscated, yet trade has continued in markets in major cities. The origin of these recently marketed animals is unknown, but it is generally suspected that they were illegally imported from Libya by Bedouins.

## <u>In situ conservation</u>:

Next to ex situ breeding programmes, the so called assurance colonies, protecting in its natural habitat is desperately needed. For a long time there was hardly any interest in protection of the species in the wild. In Egypt significant numbers of tortoises have been confiscated, trade on markets in the bigger cities however proceeded. The origin of these recent market animals is unknown but in general it is been suspected that they were illegally imported from Libya by Bedouins. Maintenance and control on legislation in these countries is very poor.

<u>Global conservation status (according to IUCN Red List)</u>

_X_ *Critically endangered*
___*Near Threatened*
___*Endangered*
___*Least* concern
___Vulnerable
___Data deficient

The species is not listed in the IUCN Red List 2008 (as of October 2008),but a new assessment by IUCN of many reptile groups is expected tobe released next year

## <u>Monitoring System</u>

All licensed wildlife breeding operations are routinely inspected to

**ensure implementation and compliance. Breeding operations are required as a procedural matter to submit quarterly returns to the Management Authority on the performance of operations. . Methods used to bring Egyptian tortoise specimens into the breeding stock When a breeding operation is licensed to breed the species, it is prohibited to remove Egyptian tortoise specimens from the wild. When breeding operations are licensed, routine inspections of breeding facilities are conducted by the Wildlife Authority. . Confidence in the use of monitoring The Wildlife Management Authority, Scientific Committees and the Administrative Authority are responsible for issuing all authorities and permits for wildlife breeding and trade in accordance with the provisions of the Wildlife Resolutions and Environmental Law No. 9 of 2009. The authority to establish a breeding operation for Egyptian tortoises and to catch the initial breeding stock is issued by the Management Authority. A breeding stock license is only issued when the Management Authority is satisfied that the applicant for the breeding operation has established a breeding facility suitable for simulating the natural habitat of the species to ensure its success in captivity.**

## Use Controls and Monitoring

All the authorized wildlife breeding operations are routinely inspected to ensure enforcement and compliance.

The breeding operations are required as a matter of procedure to file with the management Authority quarterly returns on the performances of the operations.

1. Methods used to monitor harvest

except removal of specimens of Egyptian tortoises as breeding stock upon authorization of a breeding operation to breed the species, removal from the wild of specimens of Egyptian tortoises is prohibited.

Upon authorization and licensing of the breeding operations, routine inspections of the breeding facilities are conducted by the Wildlife Authorities

2.Confidence in the use of Monitoring

The MA is responsible for issuance of all authorities and permits for wildlife breeding and trade in accordance with the provisions of the Wildlife ACT1374 of Egypt.

Authority for establishment of a breeding operation for Egyptian tortoises and capture of the initial breeding stock is issued by the Management Authority.

The authorization to capture the breeding stock is issued only when the Management Authority is satisfied that the applicant for a breeding operation has put in place appropriate breeding facility that replicates the natural habitat of the species for its success in captivity.

**Legal framework and law enforcement**

Hunting and dealership in wildlife and wildlife products have been outlawed in Egypt by an Act of ------ since -- and -- respectively. However, Wildlife Act allows the Minister in charge of wildlife to make regulations for the better management of wildlife farming. Within the provisions of Section --- of the Wildlife Act, trade in specimens of Legal framework and law enforcement trade in specimens of Egyptian tortoises bred in captivity is allowed.

Trade in wild collected specimens of Pancake tortoise is therefore prohibited by law.

Bred in captivity is allowed.

**Species Management Plan & its purpose**

One of the recommendations put forward based on the results of the Non- detriment finding studies was Through adoption of a decision by the CITES Conference of the Parties, a)

1-only specimens of not more than --cm and from the breeding operations should be allowed into the trade in order to control illegal collection of juveniles of the species from the wild.

a) considering that Egyptian tortoise occupies a very specific type of habitat, the breeding operations should replicate as much as possible the natural habitat of the species

b) the ratio of hatchlings to adult females in a breeding operation should reflect the known reproduction rate of the species in its natural habitat unless manipulation of conditions in the breeding operations scientifically prove otherwise.

**AT NATIONAL LEVEL**:

• Efforts should be made to have community programmers planned and initiated to create awareness on Egyptian tortoise and threats to the species, promote the importance of the species to the local people and help to counteract the already identified threats to the survival of the species in the non-protected areas.

• Establishment and promotion of Egyptian tortoise conservancy areas/sanctuaries/nature reserves that may be private or community based managed as the preferred option to that of breeding in captivity considering the biology of the species.

• Research studies should be promoted, guided and supported to generate more scientific information on Egyptian tortoise.
The research mainly to focus on the species ecology/and or behavior should be highly applied with strong implications for the species conservation and management.
Data on population dynamics, social and reproductive behavior, home range size, movement pat-terns or on reproduction growth and mortality rates should be generated as much as possible as this information is important for Population Viability Analysis, population modeling and to conservation planning.

## G. Use of species (Utilisation) Domestic Use of Species (Domestic Utilization)

### Collection

**Egypt Large numbers of Egyptian tortoises were historically collected from the northern coast of Egypt during most of the first half of the twentieth century for sale as pets (Bahaa El Din 1994, p. 25). Collective collection of the species for the pet trade was recognized as early as 1933 (Flower 1933, p. 746). With the return of the Sinai to Egypt in 1982, another area became open to collectors. Historically, Egypt exported Egyptian tortoises to European and American markets. Professional tortoise collectors and local residents acknowledge that large numbers of Egyptian tortoises were collected in the past and sold to traders in Cairo for sale as pets (Bahaa El Din 1994). No evidence of recent commercial collection of Egyptian tortoises has been found in Egypt (Bahaa El Din 1994). There are concerns that poachers may target the Zaranik Protected Area in northern Sinai (McGrath 2011, n.d.). Some local residents also keep tortoises for their entertainment (Bahaa El Din 1994, p. 23; Tortoise farming is widespread in rural areas and is particularly popular with children. Tortoises are considered good luck charms and are**

**collected and kept in Home (Schneider and Schneider 2008, p. 150; Tortoise Trust 2014, n.d.). Large animal traders kept large numbers of animals from the market for export. Egyptian tortoises were also found for sale in the markets of Alexandria, Marsa Matruh, Port Said, and Aswan (Bahaa El Din 1994, p. 26). - Locals in Libyan cities collected tortoises and arranged shipments to Cairo (Atom, personal communication, in McGrath 2011, n.d.). Between 1995 and 2000, the number of tortoises for sale declined dramatically, with fewer than 400 reported in local markets (Bahaa El Din 2003, p. 653). However, since then, customs seizures and periodic raids on illegal pet markets in Cairo and Alexandria have uncovered thousands of Egyptian tortoises smuggled from Libya, where local shepherds and Egyptian migrant workers catch them and sell them for around 5 Egyptian pounds (EGP 1 = US$ 0.056) each to supplement their meager incomes. Export prices for Egyptian tortoises have risen (Bahaa El Din 2020, Pers.com).**

## H. Regulations and Trade Control (Export and import species)

Acc.to

Legislation / Enforcement / Trade levels

•CITES MA annual reports,

•CITES Trade Database,

•Herpetologists,

•Traders,

•Seizure records,

•Press releases, and

•Actual surveys

Egyptian tortoise reported in tradefrom1995–2018(CITES 2019, unpaginated). Source and purpose are defined by the CITES Trade Database Guide (CITES 2013).

### (a) Source of Egyptian tortoises reported in trade

| Source | Importer Reported Quantity | Exporter Reported Quantity |
|---|---|---|
| **Wild (W)** | **177** | **139** |
| **Captive (C)** | **350** | **1071** |
| **Confiscated (I)** | **466** | **73** |
| **Captive F1 (F)** | **37** | **13** |
| **Unknown (U)** | **1** | **16** |
| **Captive for Commercial purposes (D)** | **8** | **8** |
| **Not reported** | **3** | **0** |

| | | |
|---|---|---|
| **Total Reported** | **2636** | **1220** |

(b) Purpose of Egyptian tortoise trade

| Purpose | Importer Reported Quantity | Exporter Reported |
|---|---|---|
| **Quantity Breeding (B)** | **10** | **26** |
| **Law Enforcement (L)** | **2** | **2** |
| **Personal (P)** | **42** | **29** |
| **Scientific (S)** | **258** | **13** |
| **Commercial (T)** | **2084** | **1046** |
| **Zoo (Z)** | **104** | **96** |
| **Not reported** | **136** | **8** |
| **Total Reported** | **2636** | **1220** |

| Year | Taxon | Importer | Exporter | Importer reported quantity | Term | Purpose | Source |
|---|---|---|---|---|---|---|---|
| 2022 | Testudo kleinmanni | IT | EG | 200 | live | T | C |
| 2023 | Testudo kleinmanni | IT | EG | 50 | | T | C |

Low demand for this species, small wild populations, CITES Appendix I listing, or a combination of these factors..
According to the Convention on International Trade in Endangered Species (CITES) International Trade Database, there have been 111 entries in Egyptian tortoise trade since 1995, when tortoises were included in Appendix I, through 2018. However, the majority of tortoises reported by exporters were from captive sources. There are differences in how importing and exporting countries report their trade; in general, approximately 66 percent of Egyptian tortoises reported by importers, and 2.5 percent reported by exporters, were live tortoises obtained from the wild. The tables provide an overview of the source of tortoises reported in trade and the purpose of the trade. In 1995, the United States was the importing country and Egypt was the exporting country. Since 1995, fewer than 20 live tortoises have been reported in trade to the United States, and fewer than 5 of these live tortoises were imported from the wild (CITES 2019, n.d.). According to the Law Enforcement Management Information System (LEMIS), since 1999, there have been only four imports and one live export of Egyptian tortoises to the United States. The most recent import, in

2005, of a single shell was seized via international mail (Tompkins 2020, personal communication).

## I. Protected Area

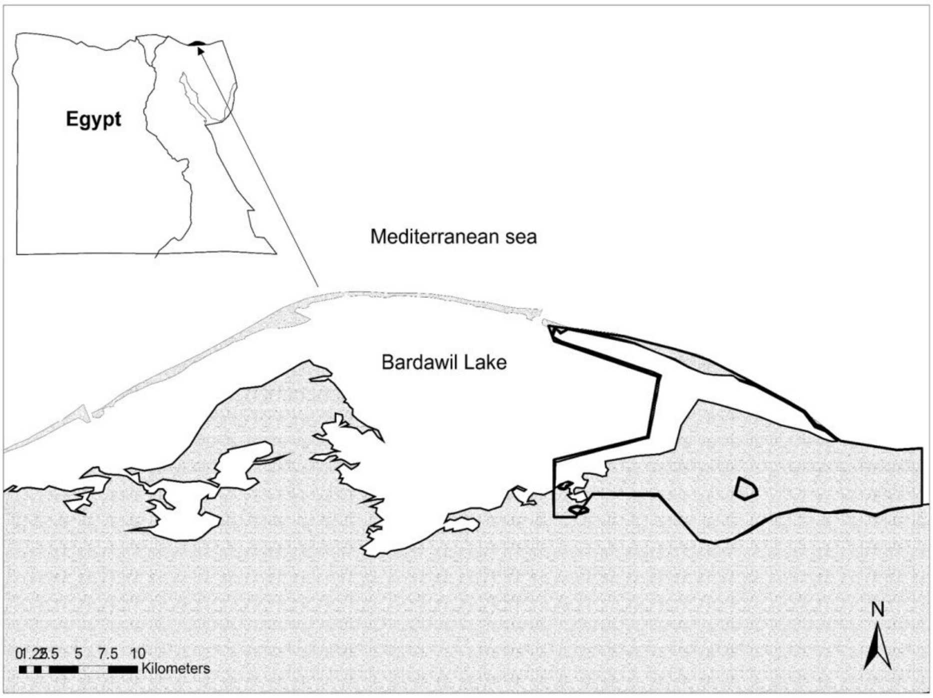
**Protected areas where suitable habitat for the Egyptian tortoise is known to occur include Zaranik Protected Area in North Sinai and in the El Omayyad Protected Area (NCS 2006, pp. 47-48; McGrath 2011, unpaginated; Attum *et al.* 2010, entire), although both of these protected areas experience habitat degradation from activities such as local populations grazing their animals. Established in 1985, the Zaranik Protected Area is approximately 250 km$^2$ (97 mi$^2$) with one-third of the protected area as sand dunes and the other two-thirds water surface in the Mediterranean Sea (Egypt State Information Service 2019, unpaginated). El Omayed was established in 1981 and is approximately 75,800 ha (193,978 ac) (Egypt State Information Service 2019, unpaginated). Two other areas proposed for protection that may include Egyptian tortoise habitat are El Salum along the Mediterranean coast and El Qasr in the Western Mediterranean Coastal Desert (Baha El Din 2003, p. 654; NCS 2006, p. 13). However, we do not have information on the status or habitat condition of these areas.**

**<u>Zaranik Protected Area</u>**
**Zaranik and the peripheral area contains populations of Egyptian tortoise in North Sinai, Egypt. In 1997, 300 Egyptian tortoises from Libya were confiscated from the pet trade and given to Tortoise Care Egypt in an effort to start a conservation program that would reintroduce these animals into their natural habitats in Egypt (Attum *et al.* 2007b, p. 398). However, after it was revealed that a wild population existed in Zaranik, all the confiscated Egyptian tortoises from Libya that were being raised ex situ were transferred out of the area to avoid crossbreeding Libyan and Egyptian animals (McGrath 2011, unpaginated; Attum *et al.* 2007b, p. 404). The population of Egyptian tortoises in North Sinai is very small, approximately 100 individuals inside Zaranik and 150 outside of the protected area (Attum 2019, pers. comm.; Attum 2020, pers. comm.; Baha El Din 2020, pers. comm.).**

**Local Bedouins manage the native tortoise population in Zaranik. A Bedouin women's handicraft program was also launched at this site to generate a sustainable source of financial benefit through the production of handicrafts with tortoise motifs. This small program is**

**especially vital in raising awareness for the species (Baha El Din 2003, p. 654; Attum *et al.* 2007b, p. 399).**

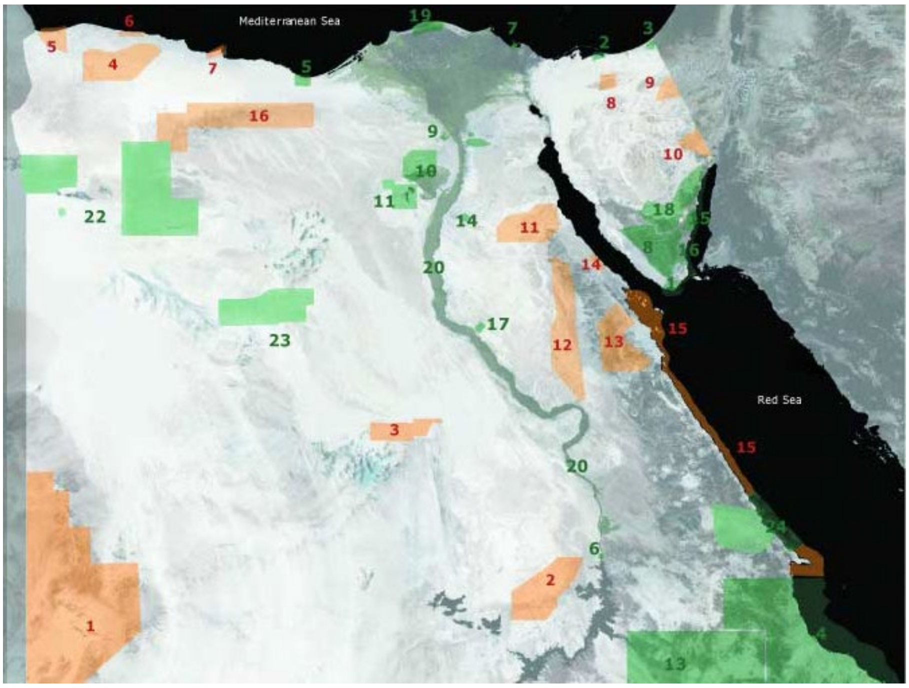
**Figure. Zaranik Protected Area, North Sinai, Egypt (bolded area) (Attum et al. Unpublished paper)**




***<u>El Omayed Protected Area</u>***

**An attempt to release captive tortoises in the El Omayed Protected Area, 80 km (50 mi) west of Alexandria, took place in 2005(Attum *et al.* 2010, entire). Like Zaranik, a community management approach was used to collect data on the released tortoises in this area. Of the total released (n=109), 21 individuals were found alive (19 percent), eight were found dead, and the others were unable to be relocated (Attum *et al.* 2010, p. 13; McGrath 2011, unpaginated).We do not have recent information if the Egyptian tortoise existsin this area but we presume that no Egyptian tortoises occur in El Omayed because there are no data to suggest tortoises have been present following the reintroduction attempt in 2005.**

**Figure. Protected areas in Egypt: current (green) and proposed (orange). #2 (green) is Zaranik; #5 (green) is El Omayed; #4 (orange) is El Qasr; and #5 (orange) is El Salum (NCS 2006, p. 7).**




## J. Human and Egyptian tortoise interaction

Other Stressors

**Salt Mining**

Since the Arab Spring in 2011, salt mining is a new stressor near Egyptian tortoise habitat. Because of the poorer financial situation of local inhabitants due to not being able to graze animals due to lack of security, many people have resorted to salt mining, which involves converting dried salt plains to mines by pumping water on the plain and then letting it dry to harvest the salt. While these plains are not Egyptian tortoise habitat, these operations have a huge footprint and occur in the general areas with tortoises exposing the tortoises to vehicular traffic and increased human traffic(Attum 2020, pers. comm.). Desertification All three countries where the Egyptian tortoise occurs are experiencing desertification, which is land degradation in typically dry areas caused primarily by climatic variations and human activities (Saad et al.2011, p. 13680; Ahmed 2015, p. 43; Rasmy et al.2010, p. 101). Desertification results in a reduction in the productivity of the land that is permanent on a human time scale (NASA 2007, unpaginated). Desertification is one of the main environmental issues in Libya affecting the environment and its resources because of urbanization, destruction of natural vegetation, and loss of fertile soils (Sadd et al.2011, p. 13680). Egypt is susceptible to high to very high desertification sensitivity because of the rapid urban encroachment on its fertile land (Rasmyet al.2010, pp. 102-103). In the Negev Desert in Israel, signs of emerging desertification and of future potential risks have been detected (Portnov and Safriel 2004, p. 665). The trend of urban concentration in the central part of Israel, which occurs mainly at the expense of agricultural land, continues to force agricultural activities towards the semi-arid northern Negev, and even the arid and hyper-arid central and southern Negev Desert (Portnov and Safriel 2004, p. 660). The results of desertification in this region caused by urban and agricultural expansion, overgrazing, and removal of natural habitat will lead to decreases in arable landand plant cover, deteriorating environmental conditions, and destruction of habitats for animal and plant species and micro-organisms ((El-Tantawi 2005, Emgaili 2003, and Libya General Planning Council 2003, all cited in Saad et al.2011, p. 13863); Abahussain et al., 2002, in Saad et al.2011, 13864; Rasmyet al.2010, p. 110). Thus, desertification will affect Egyptian tortoise by permanently reducing suitable habitat areas and availability of food and shelter resources for the species.Throughout the range of the Egyptian tortoise, the continued alteration of the environment and ecology of vast areas of desert by cultivation and urbanization facilitates secondary changes, such as expansion of invasive plants and animals, and changes the local ecology in ways that may affect the long-term survival of the species. The Egyptian tortoise is the most sensitive

## K. Reproduction and Captive Breeding

Egyptian tortoise scan store sperm for long periods, as has been described in other chelonian species. They produce multiple clutches each year. **Sexual maturity** Sexual maturity of the Egyptian tortoise in captivity is reached at a minimum age of five years. Females on average mature later than males. Maturity data from the wild are deficient.

**Seasonality of cycling In the wild**, multiple clutches of eggs are laid in early-late Spring
**Oviposition,** clutch size and incubation The Egyptian tortoises mate in winter and early spring. The breeding period in the wild lasts from March

until the end of June in which each female produces two to three clutches. Each clutch consists of one to four eggs. The eggs of the Egyptian tortoise are relatively large (20 to 22 mm wide and 25 to 28 mm long) and the size of the eggs can reach a size of 28% of the body length of the female.
The rear part of the plastron of the Egyptian tortoise is flexible which an advantage when laying relatively large eggs is. Females lay their eggs in a sandy substrate at a depth of about 3-5cm which are dug in the shade of a (small) shrub facing east or south. The temperatures inside the nests ranged from 24.3°C to 38.2°C during incubation.
The estimated between-clutch period is between 20 and 30 days

**Sexual behavior**

Egyptian tortoises are not very aggressive during mating. Sexual behavior consists of knocks by the male on the posterior part of the carapace of the female causing her to stop. This is followed by climbing on the back of the female and pushing his tail beneath hers[30]. At the same time the male utters a series of rasping and high pitched calls, which resemble the sound of a pigeon

**Secondary sexual characteristics**

adults showed different ontogenetic patterns between sexes: in females the posterior portion of the carapace narrows in the dorsal view, the carapace tends to assume a pyriform shape in the lateral view, and the plastron tends to lengthen of the midline and shows a slight lateral enlargement. Male shape changes towards the posterior portion of the carapace, a bending of the seam between marginal and pleural scutes, allowing the body to assume a hemispherical shape, and ventrally, the plastron narrows strongly, posteriorly. The latter feature was mainly due to the shortening of the anal scutes, probably facilitating copulation by allowing more space to move the long tail.

**----Nesting sites**

The eggs are buried in the soil. The nest was a shallow pit at a base of a bush. The breeding biology of Testudo kleinmanni is similar to that of other small highly specialized tortoises

**---Reproductive season**

My animals start with the mating season from about the end of October, until late February, with mating activities most likely in the months of December In this cycle, you can expect breeding from April to September,

**---Clutch size**

Each female produces one to two clutches. Each clutch consists of one to four eggs and usually 5 eggs per year, the maximum number of eggs per year is 8

**---Egg size / hatchling size**

**The eggs are elongate and range from 31.5 mm long X 22.5 mm wide to 34 mm long x 24mm wide with an average of 32.5mm long X 23.5mm wide. The eggs weigh between 7-9 g. Females typically lay one egg at a time, but on occasions two are laid simultaneously**.

**---Incubation duration**

**the eggs can take between 70 and 111 days to hatch**

**--- Sex determination**

**Temperature dependent, The males have an average carapace length of only 95 mm while the larger female can attain a carapace length of 127 mm**

**----Sperm storage**

Probable Multiple paternity within clutches of several eggs is common

***Sperm storage* is a well documented phenomenon with terrestrial tortoises**

## L- EVALUATION OF DATA QUANTITY AND QUALITY FOR THE ASSESSMENT and Conclusion

**Data generated from detailed reporting by the breeding operations on levels of successful recruitment in the breeding operations against the number of specimens approved for removal from the wild as breeding stocks is evaluated and analyzed to provide information on the species population dynamics. The information is also used to monitor compliance.**

## Conclusion

**Habitat destruction is the major factor that led to the disappearance of T. kleinmanni from most of its former range in Egypt. , but it is doubtful that it will lead to the complete extermination of the species from all areas. There will always be a few individuals that may escape and succeed in reestablishing their habitat (if the habitat still exists). Large-scale habitat destruction is likely to have a more detrimental effect on the species and its future survival, because it completely eliminates the means of survival of any individual animal and reduces the chances of its recurrence (naturally, through introduction or protection). Although the range of the species in Egypt is quite large, much of its natural habitat has been completely destroyed or severely degraded. The general condition of the species' habitat in northern Sinai is slightly better than on the northern coast**

**Evidence suggests that a few individuals or groups still survive in Egypt, where they are scattered thinly in parts of the species' former range, which is now very fragmented. The species may be considered endangered in Egypt, as the few remaining scattered individuals do not have large enough habitat units to support**

**them. On the other hand, the numbers of animals exported from Libya indicate that there is a large population of T. kleinmanni that may have been underestimated in the past, but will face the same fate as the Egyptian population**

## Recommendations .

**Some of the following recommendations could form the basis of a national plan for the conservation of Egyptian tortoises**

### 1- Stop collecting and trading from the wild

**As a first and most important step, trade from the wild should be stopped, and this is done by implementing the provisions of Law No. 4 of 1994. Priority should be given to stopping the flow of animals from Libya to Egypt**

### 2- Informing and educating the public

**One of the most important components of any work to conserve T. kleinmanni is educating and informing officials and the public about the plight of this species. Very few people (even in the field of conservation) are aware of this species, let alone its problems. Before we can expect any action from local officials in Egypt and Libya, they need to be aware of the problem and its magnitude**

**The components of the media/educational "campaign" could include: writing letters to key stakeholders, producing a brochure/leaflet about the species and producing a poster that could be distributed to ports and border control officers as well as local schools in the North Coast and North Sinai, etc., to encourage the conservation of the species. Some of these materials could also be used in Libya, if .developed**

### 3-Prioritizing the national conservation of T. kleinmanni

**The conservation of the Egyptian tortoise should be placed at the forefront of the Egyptian natural history conservation agenda, especially in light of the new and growing interest in the country's biodiversity. The Egyptian tortoise is one of the very few examples of an endangered animal species for which Egypt bears a large share of responsibility**

### 4- Targeting protected areas as a focal point for in situ conservation

**Protected areas, whether existing or potential, can play an important role in conserving T. kleinmanni habitat in Egypt and could be the only hope for the species in the country. Two protected areas are located within the natural range of T. kleinmanni; Zaranik and Al-Amid. The Zaranik Protected Area is located in North Sinai at the tip**

**The eastern Bardawil Lake covers an area of about 170 km2, including some fairly suitable turtle habitat. The El-Omaid Protected Area is located on the northern coast about 70 km west of Alexandria, extends from the coast to about 20 km inland and includes what must have been a major turtle habitat in the past. Priority should be given to improving turtle habitat within these two protected areas and developing "turtle" management plans for them, which will take into account the special conservation needs of T. kleinmanni. Further areas containing good habitat for T. kleinmanni should be nominated for inclusion in the Egyptian network of protected areas.**

## 5-Adoption of ex situ conservation measures and breeding center

**Given the relative ease and low cost with which T. kleinmanni can be reared and propagated in captivity (at least in Egypt), ex situ conservation measures should be considered positively.**

**Encourage the establishment of breeding centres and aviaries, whether private or official, with officially approved licenses and under the supervision of the administrative body and scientific committees of the CITES Convention and the wildlife management, provided that they are dealt with in accordance with the terms of the CITES Convention, and this is what we are doing now.**

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# B-Husbandry and captive breeding Farming in EGYPT

**----Maximum length of females**


Depending on the abundance of food plants in their habitat maximum carapace length, 144.2 mm;

**-----Management of the breeding groups**

2 enclosures with a total of > 2.000 tortoises (♂:♀= 1:3), approximately 1 $m_2$ per animal, additional feeding with grass and some fruits. Under these conditions the ♀♀produce usually 1 to maximum 2 clutches, with 3 -4 eggs per year. Because feeding is not reduced in summer,

**---Average size eggs / hatchlings**

The eggs are elongate and range from 31.5 mm long X 22.5 mm wide to 34 mm long x 24mm wide with an average of 32.5mm long X 23.5mm wide. The eggs weigh between 7-9 g.

**---Incubation**


the incubation substrate does not seem at all critical. Sandy earth, vermiculite or a combination of both have been used with equal success. The eggs rest on the surface of the substrate and are not buried. Humidity within the incubator is provided by means of a water tray containing a sponge. For Testudo eggs the relative humidity is normally maintained at 70-80%, but again this does not seem critical.

The normally suggested incubation temperature for most Testudo species is circa 30-31°C,

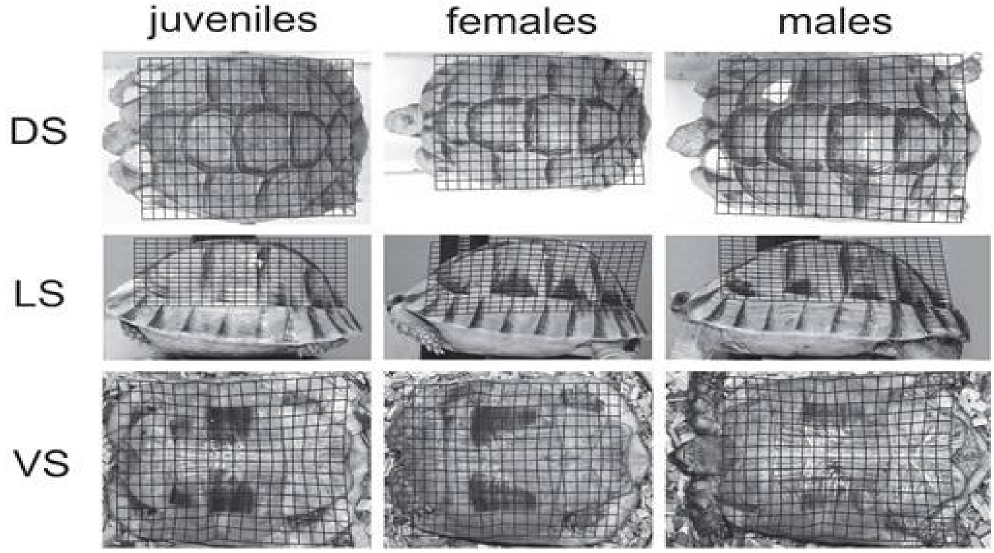
**----Rearing (7 months)**

Daytime temperatures 30 -36 °C, night temperatures 24 -26 °C; feeding is five times a week with food containing 21 % protein; stocking density 70 - 80 animals / $m_2$; mortality during rearing 5 % (mostly within the first month); since hatching is in autumn the tortoises are soaked regularly to prevent them from entering hibernation Hatching may take a few days, during which time the hatching tortoise should not be disturbed. Disturbance may lead to the hatchling leaving the egg shell with a large yolk sac still present.

Juveniles are left in the incubator on wet paper tissues until the shell has completely unfolded, the yolk sac has been absorbed and the umbilical opening has closed.It is safe to put them after yolk sac absorption on regular substrate as used for the adult animals

**---Sexual maturity**

*Overlay of deformation grids on respective dorsal (D), lateral (L) and ventral (V) images of a representative juvenile, adult male and adult female* T. kleinmanni *from Libya- Egypt* (Daniele Macale, Alberto Venchi, Massimiliano Scalici.




Sexual maturity of the Egyptian tortoise in captivity is reached at a minimum age of four years. Females on average mature later than males. Maturity data from the wild are deficient

**---Production**

730 hatchlings per year from captive breeding (C) -

--Release of captive bred tortoises into the natural habitats

Juvenile tortoises with 4 cm CL have a low survival rate in their natural habitat; In future 3 -5 % of the hatchlings will be head-started until they reach a CL of 8 cm CL and subsequently released While captive breeding programs exist, efforts to reintroduce Egyptian tortoises to the wild have stumbled. An early project aimed to release hundreds of liberated pet tortoises into the wilds of Zaranik, but fell through after scientists discovered a native population there and feared crossbreeding would weaken its genetic substrate. A similar attempt to release captive tortoises in the Omayed Protectorate, 80km west of Alexandria, fizzled after the .tortoises began turning up dead

**---Distinguishing characters**

Farm raised tortoises have less abraded carapace surfaces and therefore a more nuanced coloration than the usually quite even-colored wild caught tortoises

**--- First offspring after acquisition**

Often the eggs of the very first clutch of females hatch, but then it will take several years to get the next hatchlings from eggs of that female. After that there are usually hatchlings every year

**----Breeding in captivity to F2 generation**

Yes, breeders reported F2 or subsequent generations. No specific characteristics of inbreeding like higher malformation rate or color mutations are known from captive breeding in several subsequent generations

**--- Eggs**

**The eggs are elongate and range from 31.5 mm long X 22.5 mm wide to 34 mm long x 24mm wide with an average of 32.5mm long X 23.5mm wide. The eggs weigh between 7-9 g. Females typically lay one egg at a time, but on occasions two are laid simultaneously.**

**--- Clutches / year**



Females laid 1-2 clutches per year, each consisting of 1-3 large eggs. The inter nesting period was estimated to be 20-30

**---Mortality**

Includes mortalities of eggs that didn't hatch      80%  live

**---Hatchling weight**

the hatchlings measured between 28-30mm in length and weighed between 4-5 g.

**---Longevity in captivity**

The estimated maximum lifespan of Egyptian tortoises in captivity is 26.29 years for females and 22.18 years for males, There is no data available of the maximum lifespan is of the Egyptian tortoise in the wild

**---Incubation duration**

The normally suggested incubation temperature for most Testudo species is circa 30-31°C, and 60 -70 % relative air humidity ca. Our two present hatchlings emerged in 78 days and 111 days.

---Incubation temperature

30-31°

**---Husbandry conditions**

Each unit measures 2' X 6' and is further sub-divided into two to allow separation of males and females. It consists of a plywood base surrounded by a 6" high coated chipboard wall. Lighting is simple in the extreme, consisting of a single 40W mini-spot light situated in each section. A 40 W Tru-lite full spectrum tube is also included. Each section features a potted plant (for decoration and shade) plus a number of rocks to encourage climbing activity and a 60% dry loam 40% sand substrate. Overnight heating is provided by low-wattage heat pads. Ambient daytime temperatures are maintained in the region of 17-24C with most activity occurring in the middle of this range.

**--- Sex ratio at hatching**

sex ratio in favour of females: the most stress-free ratio would be 1 male to 2-3 females

**---Estimation of the difficulty of captive reproduction**

Not difficult for well-informed keepers

**--- Care of the young, technical and time effort**

In well-structured outside enclosures with greenhouse / cold frame there is not much work for the keeper: Usual health check of the animals, changing the water and in spring giving additional food

**--- Security measures necessary**


No, but the tortoises are persistent excavators and agile climbers and they happen to sneak out of their enclosures, even getting quickly over high wire-mesh fences

## Captive Breeding

**Captive breeding requires more care than in other Testudo species,**

**Enclosure**

---

**Dimensions**

Testudo kleinmanni proved to be a very active tortoise in captivity.
In particular males during the active periods (spring and autumn) are very busy walking and examining their environment. With this respect they need a lot of spaces.
For one adult couple the minimum size for an enclosure is to be recommended of 2,0 $m^2$.
Juveniles can be housed in size enclosures to the adults relative to their body size.

**--- Substrate**

Different suitable substrates can be used. Mixtures of dry sand, loam and/or coconut fiber soil can be used. Care should be taken that the animals cannot accidentally or intentionally ingest soil particles, as this can lead to impaction.

**---Furnishings Structures**

that provide shelter should be used as Egyptian tortoises like to rest under objects such as live or dried plants or pieces of wood.
These can also serve as visual barriers between animals.

**--- Lighting and temperature**

The daily and annual daylight period should be adjusted to the circumstances of the region of origin.

In particular, UVA and UVB radiation is necessary for the Egyptian tortoise. During the year, the photoperiod ranges between 10 and 14 hours a day UV-B radiation is essential for vitamin D3 synthesis as part of a reptile's calcium metabolism and immune function.
Baineset al.

It is important to keep the basking area surface temperature around 35°C to allow optimal thermoregulation.
During summer, daytime ambient temperature should be 28-30°C and night-time ambient temperature 20-25°C.
During winter, daytime ambient temperatures can be between 20-25°C and night-time ambient temperatures should be significantly lower (10-15°C).
Outdoor housing may only be possible in Mediterranean countries

**--- Humidity**

The relative humidity (RH) ranges from 29% to 89%. The substrate should never be completely dry in the whole enclosure.

## <u>Feeding</u>

The diet of the tortoises is geared towards a low protein, high fiber and high calcium intake.
Correct feeding (quality and time) is important for Egyptian tortoises.
Do not feed the tortoises too much or too little and always feed the tortoises a varied high-fiber, low-protein vegetable diet.
Fruits and animal matter should be avoided.
--- Basic diet various food items can be used. Most recommended are various wild herbaceous plants (e.g. dandelion, Plantago spp., thistles, clover, Brassica spp.) and chicory, endive, romaine and other leafy greens. Mixing the fresh greens with tortoise hay pellets or chopped hay for

additional fiber to aid digestion is hugely recommended.
-- Juvenile tortoises receive the same diet as adults. Supplements should be used to enrich the diet with calcium and vitamins. Various brands can be used depending on local availability and roughly 1% of dry matter diet should consist of calcium. Cuttlefish bone (sepia) is a good calcium source.

Food should be provided in a shallow bowl or on an otherwise clean surface, to avoid ingestion of substrate particles which may lead to impaction.

Food quantity is not very important if the nutritional value of the food is appropriate: in their natural environment, these tortoises always have access to (fiber-rich) food.

### --- Water

Water is offered in a small shallow dish/bowl and should be available at all times.

## Enclosure dynamics

**Social structure**

The optimal group composition is one with a sex ratio in favour of females: the most stress-free ratio would be 1 male to 2-3 females.

An inverse sex ratio may lead to stress due to continuous mating attempts by the males, and due to competition between males. Aggression between Testudo kleinmanniis rare and single-sex groups is therefore possible.

**--- Sharing enclosure with other species**

Egyptian tortoises are a tolerant species and generally unaffected by non-aggressive calm species that share the same environmental requirements. Examples are Uromastyx spp., Xenagama spp., Cordylus spp, Agama spp., Gerrhosaurus spp.

Housing Testudo kleinmanni with other tortoise species is generally unadvisable because of inter-male aggression and the chance of hybridization.

## Breeding dynamics

The sexes do not usually have to be separated outside of the breeding season, but this may be necessary if continuous mating attempts from the male appear to stress the female.

--- Mating

mating behavior in captivity equals that in the wild: Egyptian tortoises are not very aggressive during mating.
---Sexual behavior
consist of knocks by the male on the posterior part of the carapace of the female causing her to stop. This is followed by climbing on the back of the female and pushing his tail beneath hers.
At the same time the male utters a series of rasping and high pitched calls, which resemble the sound of a pigeon
.--- Egg laying and incubation Egg laying A gravid Egyptian tortoise female becomes more active, actively searches for a suitable place to lay her eggs and starts digging with her hind limbs.
Once she has found a suitable place, she will lay one to four eggs in the nest. In captivity, eggs are laid between January and July.
A suitable substrate for laying eggs is warm (e.g. 25-30°C), slightly moist(such that the substrate does not cave in, but not wet)and deep enough(>8 cm).
The substrate should have a consistency that allows digging a hole, i.e. it should not collapse. A place near the basking spot is usually preferred.
A female may lay multiple clutches per season.
- Eggs

The eggs of the Egyptian tortoise are round and often slightly flattened. The eggs have a length of 28-32 mm and a width of 21-26 mm.
- Incubation Artificial incubation is needed to achieve good hatching results. Preferable, the eggs should not be turned during incubation, as this can lead to embryonic death.
Incubation substrate needs to be dry at an elevated relative air humidity (70-95%). This can be achieved by placing a water bowl inside the
---incubator .


Hatching takes place after approximately 80-120 days, and lower temperatures lead to longer incubation periods. Constant incubation temperatures ranging from 26-34°C can be used.

Higher temperatures (32-34°C) yield mostly female hatchlings whereas lower temperatures will yield mostly males

--- Birth/Hatching

Hatching may take a few days, during which time the hatching tortoise should not be disturbed.

Disturbance may lead to the hatchling leaving the egg shell with a large yolk sac still present.

Juveniles are left in the incubator on wet paper tissues until the shell has completely unfolded, the yolk sac has been absorbed and the umbilical opening has closed. It is safe to put them after yolk sac absorption on regular substrate as used for the adult animals.

## C- the exact number of current facilities (2)

## Facility 1

**FORM 1 BACK G ROUND INFORMATION FROM MOST RECENT INSPECTION**

**Date of inspection:**
August 2023

**Date of inspection:**
August 2023
**Name of senior inspecting officer :**
[redacted]
**Facility name** [redacted]
Date of last inspection:
August 2023

Which species is the facility registered to produce for export:
Scientific Name
Testudo Kleinmanni
**Total number of specimens at last inspection**
705 Testudo Kleinmann
**# breeding adults (where possible identify** 395
**# breeding females) at last inspection** 212
**# specimens sold / exported since the last inspection**
100 Testudo Kleinmanni

***Source Code As ascribed for previous export permits (C)**

**FORM 2 GENERAL INFORMATION ON THE FACILITY**

--Type of inspection: Initial or Routine or Follow-up (in cases where discrepancies or anomalies, detected during a previous inspection, remain outstanding) Follow-up

--Year the facility was established August 2008

How many staff are currently employed at the facility? Full time or Part time 6 Employed

Name and job title of facility staff accompanying inspecting officer(s):

[redacted] ( VETERINARY )

[redacted] (Wildlife expert in theLeague of Arab States)

--Does the operation have access to professional veterinary services? If yes, what is the name and address of vet?

Yes, under veterinary supervision

Here is a veterinary clinic inside the facility [redacted]

Address : [redacted]

Does this company keep animals at any other location(s)? If yes, where? ( NO )

**FORM 3 SPECIES INFORMATION**

Species Testudo Kleinmanni

Date species first acquired? Source and life-stage of initial stock? September 2009

| Total source | Total male | Total female |
|---|---|---|
| 40 | 16 | 24 |

Numbers of initial stock, and sexes, if known

Have animals additional been obtained since you acquired the initial stock? If so, from where?-

NO

Inspectors should ensure specimens were acquired legally and in

compliance with CITES. In the case of App. I specimens, invoices and/or bills of sale must be
produced
Samples were obtained in accordance with Egyptian Environmental Law No. 4 of 1994 and also Agriculture Law No. 53 of 1966

When did you start breeding? May 2010

# litters/clutches per year? 1

# offspring/eggs in litter/clutc 4

produced in the previous year # 109

ADULT BREEDING
STOCK
Number of adults
present? 395

Number of
males present? 183
Number of females? 212

What % of females breed each
year? 53%

(where possible)Males?Females?

What do you feed adult
animals?
Fruits, vegetables, some flowers,cabbage and hibiscus leaves

STOCK (CAPTIVE BRED)

Number of juveniles present 310

Age at sexual maturity (years)? 5-6 years

Size or mass at sexual maturity (cm or g)? 10 : 12 cm

Size at sale (cm or g) 3-5 cm

What percentage of juveniles survive beyond 2
weeks?
Includes mortalities of eggs that didn't

hatch 71%
What do you feed rearing and juvenile animals?
Lettuce leaves and
vegetables
#of breeding females 212 X Mean % females breeding per season
53%
X Mean number of litters / clutches per year 1 X Mean number of offspring / eggs in litter / clutch 4 X1Mean % surviving after two weeks71% =319 .# of young per year at the facility inspected

## Formula2

**Facility 2**

**-FORM 1 BACK GROUND INFORMATION FROM MOST RECENT INSPECTION**

**Date of inspection:**1 JULY 2023

**Name of senior inspecting officer:** [redacted]

**Facility name** [redacted]

Date of last inspection: 1 JULY 2023

Which species is the facility registered to produce for export:
Scientific Name Testudo Kleinmanni

**Total number of specimens at last inspection** 1399 Testudo leinmanni
**#breeding adults (where possible identify**
569
**# breeding females) at last inspection** 295

**#specimens sold/exported since the last inspection**
150 TestudoKleinmanni

***Source Code As ascribed for previous export ( C)**

**FORM 2 GENERAL INFORMATION ON THE FACILITY**

--Type of inspection: Initial or Routine or Follow-up (in cases where discrepancies or anomalies, detected during a previous inspection, remain outstanding) Follow-up

--Year the facility was established: 1 January 2006

How many staff are currently employed at the facility? Full time or Part time 5 Employed

Name and job title of facility staff accompanying inspecting officer(s): [redacted] ( VETERINARY )

[redacted] (Wildlife expert in the League of Arab States )

--Does the operation have access to professional veterinary services? If yes, what is the name and address of vet?
Yes, under veterinary supervision

here is a veterinary clinic inside the facility [redacted]

Address : [redacted]

Does this company keep animals at any other location(s)?If yes, where? ( NO )

**FORM 3 SPECIES INFORMATION**

Species Testudo Kleinmanni

-Date species first acquired? Source and life-stage of initial stock? September 2007 ADULT

Numbers of initial stock, and sexes, if known

| Total source | Total male | Total female |
|---|---|---|
| 50 | 22 | 28 |

Have animals additional been obtained since you acquired the initial stock? If so, from where?( NO ) *
Inspectors should ensure specimens were acquired legally and in compliance with CITES. In the case of App. I specimens, invoices and/or bills of sale must be

produced

Samples were obtained in accordance with Egyptian Environmental Law No. 4 of 1994 and also Agriculture Law No. 53 of 1966

When did you start breeding? 1 APRIL 2008

# litters/clutches per year? 1

# offspring/eggs in litter/clutch? 4

produced in the previous year

# ADULT BREEDING STOCK 213

Number of adults present? 569

Number of males present? 274

Number of females? 295

What % of females breed each year

51%

(where possible)Males?Females?

What do you feed adult animals?

Fruits, vegetables, some flowers,cabbage and hibiscus leaves

REARING STOCK (CAPTIVE BRED)

Number of juveniles present? 421

Age at sexual maturity (years)? 6-8 years

Size or mass at sexual maturity (cm or g)? 10 : 12 cm

Size at sale (cm or g) 3-5

What percentage of juveniles survive beyond 2 weeks?

Includes mortalities of eggs that didn't hatch 70%

What do you feed rearing and juvenile
animals?
Lettuce leaves and
vegetables
#of breeding females 295 X Mean % females breeding per season 51% X Mean number of litters / clutches per year 1 X Mean number of offspring / eggs in litter / clutch 4 X1Mean % surviving after two weeks70% =421 .# of young per year at the facility inspected

..

# D. the methods for proper and reliable marking of individuals

**Materials needed and How to use**

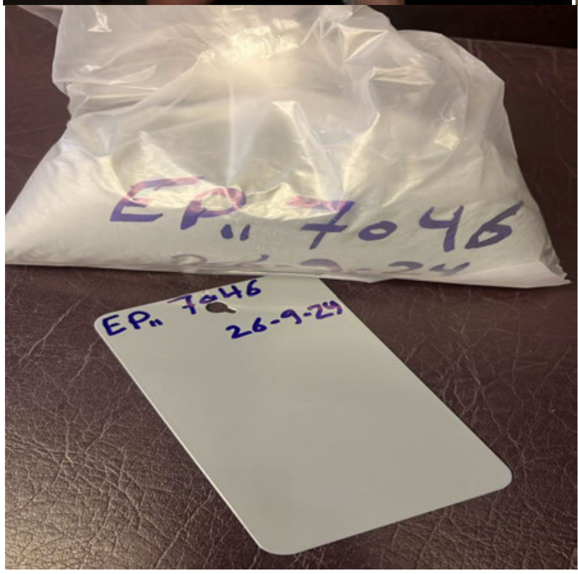
**- Clear quick-drying epoxy. A piece of white self-adhesive sticker cut to size, no larger than needed or Transparent flexible plastic**
**- We use a soft pen with dark waterproof ink and write or print the number, fixed toothpicks, old clean plastic wrap, small wet and dry**

**1-Clean and dry the area on a rough board. The cleaned area should be large enough for the sticker that will hold the number and allow the margin of the wrapper for the epoxy to overlap the sticker. For small ones, use a waterproof marker and write a letter or some dots on the scute. Repeat as necessary until the turtle is large enough for the epoxy-.covered mark**

**2-Place the sticker with your number on the cleaned area, pressing it firmly onto the wrapper with a tissue, not your bare finger but not on the table while mixing the epoxy. . In a box, if necessary**

**3-To keep the turtle relatively still while the epoxy sets, use your other hand and gently but firmly hold it over the shell opening to keep the turtle's head in. You may have to .press the turtle against your body as well, unless you have help**

**4-For small ones**
**He used a variety of paint colors to mark the carapaces of Egyptian tortoises. They found this to be less permanent, painting the last vertebral carapaces and then repainting them a different color each year. In addition to using radial markers**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