

TURTLE PREDATION

Evidence of partial consumption of adult female Indian Star Tortoise (*Geochelone elegans*) by Asiatic Lion (*Panthera leo persica*): account of vertebrate predation on Testudines



Two adult Asiatic lionesses (*Panthera leo persica*) seated in an open small patch of grass at Develiya, Gir forest: an Indian star tortoise on the left side lioness right side of the figure

IUCN Red List:

Vulnerable A4cd ver
3.1 (D'Cruze, N.,
B.C. Choudhury &
A. Mookerjee

Reptilia

[Class of Tetrapoda/
Reptiles]

Testudines

[Order of turtles,
tortoises and terrapins]

Testudinidae

[Family of land dwelling
turtles]

Geochelone elegans

[Indian Star Tortoise]

Species described by
Schoepff in 1795

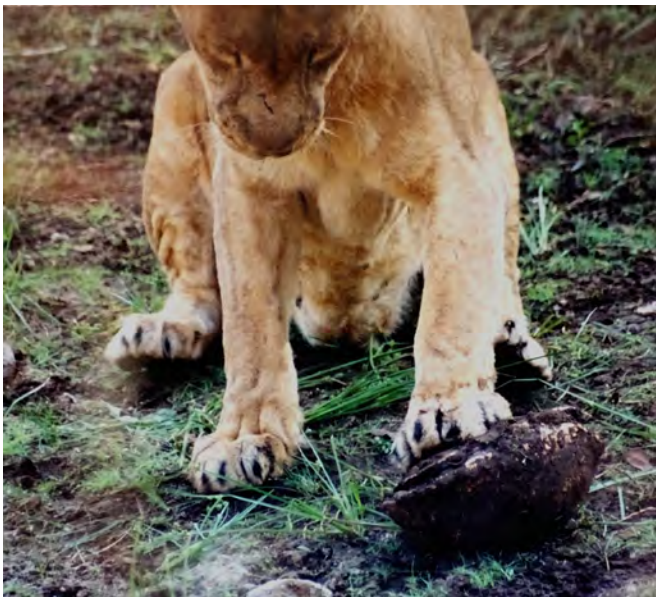
Predation plays a major role in shaping the structure and dynamics of communities and is of pivotal importance in reptile ecology (Zug et al 2001). The most important predators of adult reptiles are various species of birds, small carnivores, and other reptiles, including con-specifics (Pianka & Vitt 2003; Žagar & Carretero 2012; Somaweera et al 2013). There were few examples about encounters between large carnivores and adult turtles (De Silva 2011; Krofel 2012). Overall, encounters are rather uncommon and rarely reported from different parts of the globe, especially on various species of turtle from hatchlings to large adults. The literature review shows about 19 species of turtles of eight families are predated by various groups of vertebrates, including amphibians, reptiles, birds, mammals and (Table 1). Here, we present an unusual case of

predation behaviour of large carnivore on adult tortoise.

This account outlines an encounter between Asiatic Lion (*Panthera leo persica*) and a tortoise at Gir forest. Gir forest is the only remaining prime natural habitat of Asiatic Lion. This large forest block encompasses about 1412.13 sq km of dry deciduous forest (Champion & Seth, 1968) in the Peninsular Saurashtra, Gujarat, India. This forest is legally protected and is known as Gir National Park and Wildlife Sanctuary (Singh 2017). Total 42 species of reptiles have been recorded from Gir forest, including *G. elegans* as a common species (Vyas 2001 & 2006). This species is legally protected under schedule IV of the Wildlife (Protection) Act, 1972 and Vulnerable as IUCN RedList (D'cruze et al. 2016).

Global Distribution:

India (Andhra Pradesh, Karnataka, Orissa, Tamil Nadu), Pakistan, Sri Lanka



Asiatic lioness (*Panthera leo persica*) pressing the Indian star tortoise (at first sight it looks like a boulder) with her anterior left paw.

On October 2011, we were on a forest trek from Sasan to Kamleshwar Dam for assessing the water body. This manmade water body built on Hiran River, is one of the best habitats of Mugger (*Crocodylus palustris*) in the forest (Whitaker 2002), known for its dense population of mugger crocodiles (Whitaker & Whitaker 1984). While returning, we visited Develiya Forest block in noon about 1430 hrs; and about 150 meters away noted two adult lionesses seated in an open small patch of grass. One of the lioness suddenly woke up and immediately began to play with a large boulder nearby. The lioness was tossing and turning the boulder with her anterior paws. After a while, she sat down on the ground and began to play with all four paws. Upon observing carefully, with the help of a binocular (8 x 40), we were able to identify that it was not actually a boulder that she was playing with. It was a large sized (approx. 30 cm carapace length) live Indian star tortoise. The tortoise shell was well covered with mud, therefore making it difficult to identify with naked eyes. The act of playing with the tortoise lasted for almost 30-40 minutes, wherein she made several attempts to bite the shell. However, she was fairly unable to damage the shell, except a hard/deep bite made on the right side of the shell. She could consume a small part of the carapace shell along with a chunk of meat, during the entire episode.

On the basis of shape and size, we identified it to be a large female of Indian Star



Table 1: List of vertebrate predators and preyed turtle species

No.	Family	Common Name	Scientific name	Age	Name of Predator	Source Reference
1	Cheloniidae	Logger head sea turtle	<i>Caretta caretta</i>	A	Jaguar <i>Panthera onca</i>	Arroyo-Arce et al 2017
2		Green turtle	<i>Chelonia mydas</i>	A	Jaguar <i>Panthera onca</i>	Troëng 2000; Arroyo-Arce & Salom-Pérez 2015
3		Hawksbill	<i>Eretmochelys imbricate</i>		Jaguar <i>Panthera onca</i>	Arroyo-Arce et al 2017
4		Olive ridley sea turtle	<i>Lepidochelys olivacea</i>	A	American crocodile <i>Crocodylus acutus</i>	Ortiz et al 1997
				A	Saltwater crocodiles <i>Crocodylus porosus</i>	Whiting &Whiting 2011
5		Flatback Sea turtle	<i>Natator depressus</i>	A	Saltwater crocodiles <i>Crocodylus porosus</i>	Whiting &Whiting 2011
	Sea Turtle	(un identified)	H	Black-necked stork <i>Ephippiorhynchus asiaticus</i>	Whiting & Guinea 1999	
6	Chelydridae	Common snapping turtle	<i>Chelydra serpentine</i>	H, J	Red-shouldered Hawks <i>Buteo lineatus</i>	Stewart 1949; Jacobs & Jacobs 2002
7	Dermochelyidae	Leatherback	<i>Dermochelys coriacea</i>	A	Jaguar <i>Panthera onca</i>	Troëng 2000
				A	Killer whale <i>Orcinus orca</i>	Caldwell &Caldwell 1969; Sarti et al 1994; Pitman & Dutton 2004
8	Emydidae	Western painted turtle	<i>Chrysemys picta belli</i>	J	Red-shouldered Hawks <i>Buteo lineatus</i>	Welch 1987
9		Red-eared Slider	<i>Trachemysscripta elegans</i>	H	Cane Toad <i>Rhinella marina</i>	Kelehear 2016
10	Kinosternidae	Co. musk turtle	<i>Sternotherus odoratus</i>	H, J	Red-shouldered Hawks <i>Buteo lineatus</i>	Kimmel & Fredrickson 1981
				H, J	Black Vulture <i>Coragyps atratus</i>	Munscher et al 2016
11	Testudinidae	Star tortoise	<i>Geochelone elegans</i>	A	Mugger crocodile, <i>Crocodylus palustris</i>	De Silva et al 2011
				A	Leopard <i>Panthera pardus</i>	De Silva 2003
				J	Bengal Monitor <i>Varanus bengalensis</i>	Karunarathana et al. 2017
12		Desert tortoise	<i>Gopherus agassizii</i>	H	Common raven, <i>Corvus corax</i>	Boarman 1997
				H	Coyotes <i>Canis latrans</i>	Boarman 1997
				H	Kit foxes <i>Vulpes macrotis</i>	Boarman 1997

No.	Family	Common Name	Scientific name	Age	Name of Predator	Source Reference
13		Gopher tortoise	<i>Gopherus polyphemus</i>	A	American alligator <i>Alligator mississippiensis</i>	Rautsaw et al 2016
14		Mediterranean spur-thighed tortoises	<i>Testudo graeca</i>	H	Eagle Owl <i>Bubo bubo</i> ,	Nikolay TZankov & BoyanMilchev. 2014
					Short-toed eagle <i>Circaetus gallicus</i>	Zankov&Milchev. 2014.
	H			Brown-necked ravens <i>Corvus ruficollis</i>	Geffen & Mendelsohn 1997	
15	Testudinidae	Hermann's tortoise	<i>Testudo hermanni</i>	H	White Stork, <i>Ciconia ciconia</i>	Muzinic&Rašajsk. 1992
				H	Eagle Owl <i>Bubo bubo</i>	Zankov&Milchev. 2014
				H	Short-toed eagle <i>Circaetus gallicus</i>	Zankov&Milchev. 2014
				A	Brown bear <i>Ursus arctos</i>	Mertzanis 1994; Paralikidis et al. 2010; Krofel 2012
16		Egyptian tortoises	<i>Testudo kleinmanni</i>	H	Brown-necked ravens <i>Corvus ruficollis</i>	Geffen & Mendelsohn 1997
17	Trionychidae	Indian flap-shelled turtle	<i>Lissemys punctata</i>	J	Chequered keel-back water snake <i>Xenochrophis piscator</i>	Vyas &Thaker 2014
				J	Black-necked stork <i>Ephippiorhynchus asiaticus</i>	Vyas &Thaker 2014
				H	Cattle egret <i>Bubulcus ibis</i>	Vyas &Thaker 2014
				H, J	Greater Adjutant <i>Leptoptilos dubius</i>	Sivasubramanian & Bhupathy 1991
18		Common Snake-necked Turtle	<i>Chelodina longicollis</i>	J	Black-necked stork <i>Ephippiorhynchus asiaticus</i>	Clancy 2011
19	Chelidae	Alligator Snapping Turtle	<i>Macrochelys temminckii</i>	J, A	American alligator <i>Alligator mississippiensis</i>	Sanspreet et al 2016

H = Hatchling; J = Juvenile; A = Adult

tortoise (*Geochelone elegans*). This is the first photographic evidence of *G. elegans* predation and partial consumption by a large carnivorous animal (*Panthera leo persica*). Asiatic lions are well known predators. There have been various prey items recorded in the diet of Asiatic lions, ranging from small to large wild mammals, including domesticated animals (Joslin 1973; Hayward & Kerley 2005; Dharaiya & Soni 2012). However, none of the items included of any reptile species, except a rare case of encounter with a juvenile mugger crocodile recorded at Gir forest (Vijaykumar 1997).

Present literature survey shows a limited range of predators who prey upon turtles or tortoises, while most prey on eggs, hatchlings and sub-adult animals; but very few prey upon large adult animals (Table 1). It's very difficult to predate on large adults, especially hard-shelled tortoises and then devour them. To predate upon large adult tortoises, the predator requires some special skills and tactics, enabling it to crush and break the hard shell, to further consume the soft insides of the animal. There is a recorded case about a young leopard (*P. pardus*) who was able to kill a large adult



The lioness playing cheerfully with the Star tortoise (*Geochelone elegans*).

G. elegans at Yala National Park, Sri Lanka. Another case where a juvenile tortoise was killed by a domestic dog (de Silva 2003) and Bengal Monitor (*Varanus bengalensis*) (Karunarathana et al. 2017). So, the present account, indicates a noteworthy observation of predation and partial consumption of tortoise by an Asiatic lion. The reason might likely be associated with developmental behaviour learnt by the lioness in her early years. Thus, making it probable, that the lioness specialized at the skills required to devour a tortoise. Further studies are however needed to confirm this possible individual and local variation in tortoise predation by lion.



(a) Lioness and mud coated injured Star tortoise (*Geochelone elegans*) (b) animal without mud coating shows a missing small part of the carapace shell with a chunk of meat, which was consumed by the lioness



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Raju Vyas¹ & Manoj Thaker²

¹505, Krishnadeep Tower, Mission Road, Fatehgunj, Vadodara, Gujarat - 300002, India.

Email: razoovyas@hotmail.com

²52/C Divyajyot Society, Nr. Akashvani, Makarpura Road, Vadodara, Gujarat - 390009, India.

Email: manojcarclinic@gmail.com

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