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Distribution and current population status of freshwater turtles of District Charsadda of Khyber Pakhtunkhwa, Pakistan

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Abstract

A total of 365 specimens of freshwater turtles belonging of Two Families Viz., Geoemydidae (Crowned river turtle, *Hardella thurjii*; Brown roofed turtle, *Pangshura smithii* and Indian roofed turtle; *Pangshura tecta*) and Family Trionychidae (Indian narrow-headed soft-shell turtle, *Chitra indica*; Indian soft-shell turtle, *Nilssonina gangetica*; Indian peacock soft-shell turtle, *Nilssonina hurum*; and Indian Flap-shell turtle, *Lissemys punctata andersonii*) were identified. *Lissemys punctata* (30.95%) and *Nilssonina gangetica* (27.39%) had abundant population status, whereas, *Hardella thurjii* (1.36%) and *Pangshura tecta* (3.01%) were rare. Spotted Pond turtle (*Geoclemys hamiltonii*) was not recorded during the present study, as this Species had been reported by various researchers in different areas of Pakistan. The current study investigated the distribution and abundance of freshwater turtle Species inhabiting in different water bodies of Charsadda of Khyber Pakhtunkhwa Province. Capturing of turtles for export is a major threat to these animals. Fishermen also kill them during fishing. Canal closure, de-silting and destruction of Ecological niches are also harmful to these animals. It is concluded that it is necessary to provide effective and immediate legal protection/Coverage to all turtle species under the Khyber Pakhtunkhwa Wildlife (Protection, Preservation and Management) Act, 1975, Pakistan; otherwise turtle species will become extinct.

Keywords: Turtles, Distribution, Population, Charsadda, Pakistan

1. Introduction

The Order Chelonia (Testudine) contains 13 recognized Families. These include land tortoises, Freshwater turtles and Marine turtles. There are about 289 living species of turtles and tortoises, which are found in different habitat of the World ^[1]. Turtles of Pakistan are divided into three main categories.

Marine turtles: Green sea turtle (*Chelone mydas*) and Olive Ridley turtle (*Lepidochelys olivacea*) are the common species of marine turtles in Pakistan. Hawkes bill turtle (*Eretmochelys imbricate*), Logger-headed turtle (*Caretta caretta*) and Leatherback sea turtle (*Dermochelys coriacea*) are also found occasionally.

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Tortoises (Land turtles): Two Species of tortoises are found in Pakistan; Afghan tortoise (*Agrionemys horsfieldii*) and Sindh Star tortoise (*Geochelone elegans*).

Freshwater turtles (Terrapins): Two families of freshwater turtles are found in Pakistan, namely Geoemydidae which consist of Hard-shell turtles; Spotted Pond turtle (*Geoclemys hamiltonii*), Crowned river turtle (*Hardella thurjii*), Brown roofed turtle (*Pangshura smithii*), and Indian roofed turtle (*Pangshura tecta*) and the 2nd Family Trionychidae comprises of soft-shell turtles; Indian narrow-headed soft-shell turtle (*Chitra indica*), Indian soft-shell turtle (*Nilssonina gangetica*), Indian peacock soft-shell turtle (*Nilssonina hurum*) and Indian flap shell turtle (*Lissemys punctata andersonii*). These are larger in size as compared to Hard-shell turtles. Freshwater turtles that are consumed, soft shell turtles are considered the best due to their low bone to bone ratio and larger proportions of cartilage and gelatinous skin. This demand has made soft shell turtles the most important components of the freshwater turtle's trade in Asia ^[2].

Freshwater turtles play important role in the health of aquatic ecosystem, since they are scavengers, herbivores and carnivores, provide dispersal mechanism for plants, clean up water resources by scavenging on dead organic matter and help to maintain healthy populations of fish ^[3]. Soft-shell turtles are source of Traditional Chinese Medicine, and their shells are highly effective for purifying blood and cure many diseases ^[4]. Turtle populations are being rapidly deleted as they were not protected or conserved seriously by any Government department previously in Pakistan. Consequently some species populations are becoming threatened. Pakistan is signatory to the Convention on international trade in Endangered Species of fauna and flora (CITES) in 1976. The Government of Pakistan approved the Federal CITES Law in May 2012, for effective enforcement of CITES legislations in Pakistan. Wildlife being a provincial subject, Khyber Pakhtunkhwa Wildlife department revised the conservation status of freshwater turtles in 2007.

In Pakistan, freshwater turtle trade was first highlighted in 1990s. An investigative study by WWF-Pakistan

and the Sindh Wildlife Department for TRAFFIC International in 1996, reported turtle trade in Sindh Province ^[5].

In Khyber Pakhtunkhwa, commercial exploitation of turtles for their body parts was introduced in the year 2006 ^[6]. Illegal turtle trade, particularly in body parts of soft-shell species was reported by Baig ^[7].

The Ganges Soft-shell turtle, Peacock Soft-shell turtle, Spotted Pond turtle and the Indian saw-backed turtle are included in Appendix-I, whereas, Crowned river turtle, Indian narrow-headed soft-shell turtle and Brown roofed turtle are listed in Appendix-II of the Convention on International Trade in Endangered Species (CITES) ^[7, 8]. The Indian Flap shell turtle is Non CITES Species in Species data base of CITES of 2014 (Table 1).

The persistence of turtles is valuable not just socially and environmentally but also for the services they provide to the streams and rivers. Carrion eating species may reduce eutrophication. Anthropogenic disturbance to freshwater systems can change ranging behavior with subsequent alteration of key demographic processes. For example, stress in freshwater turtles suppresses ovulation and egg production ^[9]. To improve conservation of freshwater turtles, we need to understand how turtles respond to anthropogenic activities including; which structures impede turtle movement and how turtles respond to wetland draining.

^[10] stressed that accurate knowledge about spatial distribution is essential for effective management in the natural habitat.

No research work has been conducted on freshwater turtles of Khyber Pakhtunkhwa Province of Pakistan, so basic data on occurrence and population distribution of different Species is not available. The objective of this study was to determine the population distribution and status of Freshwater turtles in the water bodies of Charsadda (Pakistan).

Since these information are vital to identify areas of freshwater turtles and pin point their threats for proper management and conservation of the freshwater turtles.



Fig 1: Map of Khyber Pakhtunkhwa Showing District of Charsadda as Study Area.



Fig 2: Map of study sites in District of Charsadda (KPK).

- | | |
|-------------------------------|---|
| 1. Hisara Drain | 2. Branch No. 6 from Main canal of Lower Swat |
| 3. Kashmalo Drain (TurangZai) | 4. River jindi (Nimouri) |
| 5. River Swat (Khyali) | 6. Dub Drain (Mardan road) |
| 7. River Kabul (Sardaryab) | |

2. Materials & Methods

Total 7 sites, in which 3 Rivers (River Jindi, River Swat and River Kabul) 1 irrigating canal (Branch no. 6 from main Canal/Lower Swat) and 3 drain systems (Dub drain, Hisara drain and Kashmalo drain) were surveyed in the district of charsadda as shown in Table 2, Fig. 1 & 2.

The study was conducted from November 2013 to August 2014 using the following procedure for observation and census of turtles.

- Basking turtles were observed, directly counted and different species were identified with the help of Binocular Minolta (10 X 50 mm).
- No turtle was found basking during severe cold weather conditions so drag net was used for capturing of turtles. Netted animals were counted; their Species identified and then released back into the same water.
- Canals were surveyed, during canal closure season, by walking in dry canals following the

flipper prints of turtles. Animals found above ground in the dry canal were identified to species and counted, whereas the animals hibernated/buried in dried canal bed were removed from the bed, identified and counted.

- A third method used baited hooks to capture turtles and was particularly good for catching soft-shell turtles. Steel hooks were baited with intestine of poultry. After species identification and counting, turtles were released back in their natural habitat.
- Interviews were conducted from the community to obtain information about status of freshwater turtles. Special identification cards were shown during interviews to identify the species.

However, the study was based mainly on direct observation; enumerations depended on basking, captured and floating turtles.

Table 1: IUCN and CITES status of freshwater turtles of Pakistan

Species	IUCN Status	CITES Status
<i>Geoclemys hamiltonii</i>	Vulnerable	Appendix I
<i>Hardella thurjii</i>	Vulnerable	Appendix II
<i>Pangshura smithii</i>	Low Risk	Appendix II
<i>Pangshura tecta</i>	Vulnerable	Appendix I
<i>Chitra indica</i>	Endangered	Appendix II
<i>Nilssonina gangetica</i>	Vulnerable	Appendix I
<i>Nilssonina hurum</i>	Vulnerable	Appendix I
<i>Lissemys punctata</i>	Low Risk	Non CITES

Table 2: Population status and Distribution of Freshwater turtles in District of Charsadda, Pakistan

S.no.	Name of locality (water Body)	Geographical coordinates	Observed Turtles Species							Total	%
			<i>L. punctata</i>	<i>C. indica</i>	<i>N. hurum</i>	<i>N. gangetica</i>	<i>P. tecta</i>	<i>P. smithii</i>	<i>H. thurjii</i>		
1.	Kashmalo Drain (TurangZai)	34° 13' 13.30" N 71° 44' 56.24"E Elev. 309.02m	12	-	-	05	-	-	02	19	5.20
2.	Dub Drain (Mardan road)	34° 9' 38.35" N 71° 47' 26.71" E Elev. 302.15m	27	05	09	17	-	-	-	58	15.89

3.	Hisara Drain (Near Kashmir Kalay)	34° 16' 54.49" N 71° 49' 46.38"E Elev. 351.73m	25	-	03	17	-	5	-	50	13.6 9
4.	Branch No. 6 from Main canal of Lower Swat (Behlola)	34° 14' 45.56" N 71° 50' 57.62" E Elev. 346.79m	04	-	-	-	02	09	-	15	4.10
5.	River Swat (Khyali) Near Tarnab	34° 12' 58.26" N 71° 40' 6.89" E Elev. 316 m	13	07	07	11	05	11	0	54	14.7 9
6.	River jindi (Nimouri)	34° 12' 19.42" N 71° 43' 35.76" E Elev. 310 m	18	09	29	33	-	05	02	96	26.3 0
7.	River Kabul (Sardaryab)	34° 84' 79" N 71° 41' 11.16" E Elev. 294.82 m	14	09	21	17	04	07	01	73	20.0 0
		Total	113	30	69	100	11	37	05	365	
		%	30.95	8.21	18.90	27.39	3.01	10.13	1.36		

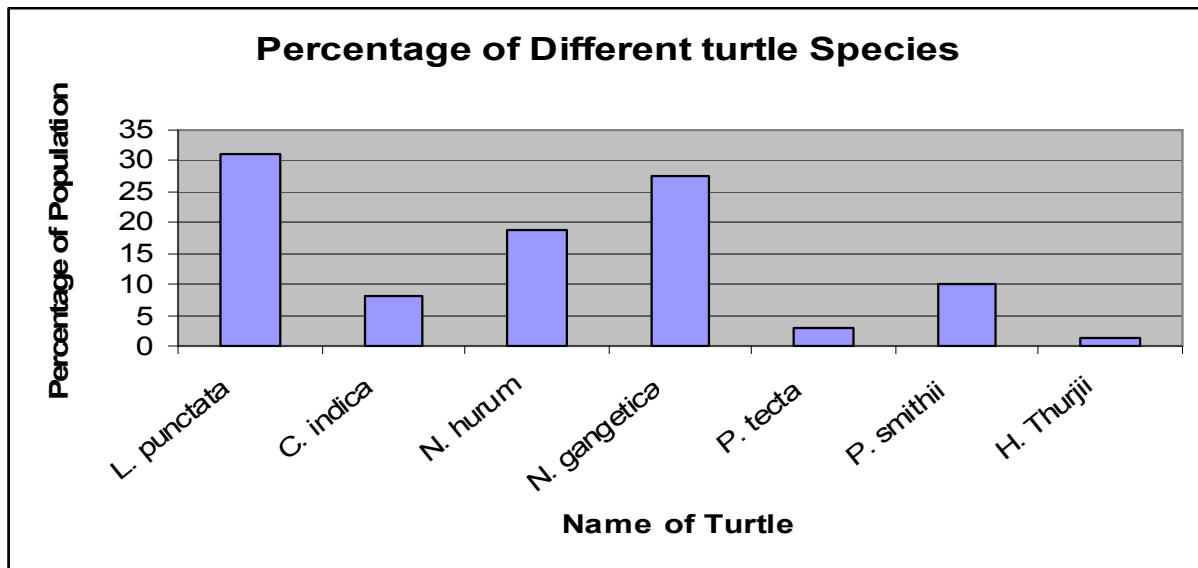


Fig 3: Population status of different Turtle Species in Charsadda District of Khyber Pakhtunkhwa.

3. Results and Discussion

A total of 365 Individual turtles belonging to two families viz., Geoemydidae (Brown roofed turtle, *Pangshura smithii*; Indian roofed turtle, *Pangshura tecta* and Brahminy river turtle, *Hardella thurjii*) and Trionychidae (Indian soft-shell turtle, *Nilssonina gangetica*; Peacock soft-shell turtle, *Nilssonina hurum*; Narrow-headed soft-shell turtle, *Chitra indica* and Indian Flap-shell turtle, *Lissemys punctata andersonii*) were identified (Table 2, Fig. 3). The most abundant species found was *Lissemys punctata* (30.95%) followed by *Nilssonina gangetica* and *Nilssonina hurum* (27.39% and 18.90%) respectively. Whereas, *Hardella thurjii* (1.36%) and *Pangshura tecta* (3.01%) were rare, whereas the status of *Pangshura smithii* (10.13%) and *Chitra indica* (8.21%) were frequent. *Lissemys punctata* (30.95%) was common in all the sites sampled. The greatest number and species diversity was recorded at River Jindi (26.30% of all captures) belonging to six different species except *Pangshura tecta*. It is a river where most of the drains of district Charsadda join it. Beside River Jindi, all the seven species were recorded in River Kabul (Sardaryab) and River Swat (Khyali) (20.00% and 14.79%, respectively). And the reason was that, that these rivers have the greater water capacity.

The Indian flap-shell turtle (*Lissemys punctata*) was the most abundant species, probably because it loves shallow streams, stagnant waters of rivers, marshes, ponds, lakes and often extends in sewage system of metropolitan cities. Minton ^[11] also reported the same behavior of the Indus mud turtle. Our data indicate collectively that *Lissemys punctata* has a healthy population and found in about all sites (Rivers, canal and Drain systems) of charsadda. The second abundant species was *Nilssonina gangetica*, which has a good population about in all surveyed sites. Mehmood *et al.*,^[8] investigated the Korang River of Islamabad-Rawalpindi, and according to their study *Lissemys punctata* was the most abundant species contributing up to 56% of the total numbers of turtles recorded. *Nilssonina gangetica* contributed 30% while *Pangshura smithii* was least abundant (08%) during the study period. The present study showed about the same result.

Noureen ^[12] reported the distribution of *Geoclemys hamiltonii* in the district of Dera Ismail Khan of Khyber Pakhtunkhwa province, but during the present study this species was not recorded in Charsadda district of Khyber Pakhtunkhwa province. According to local communities and some poachers the *Geoclemys hamiltonii* is not found in the water bodies of Charsadda by showing them the species identification card.

Suwelo ^[13] reported that the tortoises, terrapins and turtles of Southeast Asia have been harvested from the wild for a wide range of purposes, primarily for food and traditional Chinese medicines, but also for pets and to release in Buddhist sites in temples. Jetkins ^[14] reported that in recent years the trade has escalated and changed dramatically. Once predominantly for local consumption, the harvest is now motivated by international demand, primarily in East Asia and particularly China, Hong Kong, South Korea and Vietnam.

The Plastron is used to extract medicine called Guilinggao, which is commonly known as turtle jelly and is thought to cure heart diseases. Recent studies can also be found which state that the extracts from turtles are also used in cosmetics. One needs to focus on the growing pharmaceutical industries that accelerated the rate of animal slaughter.

During our interviews in Charsadda, we clearly noticed the lack of awareness about conservation, as well as illegal trading of endangered species including freshwater turtles. According to locals, Turtles of all kinds were hunted by some groups of local and outside residents a few years ago to the point that they were almost wiped out all the turtles. But still we see today a reasonable population here, which indicates that population, has recovered from harvest with in a relatively short period of time, perhaps because of ideal conditions for growth.

During our study some threats to turtles population was also recorded which are given below in order of their magnitude.

1. Freshwater turtles do not have any legal protection coverage through any provincial Act; therefore, they are being captured in thousands for supply to foreigners living in Pakistan and to illegal export for supply to abroad. Reports of capturing turtles on large scale were received from these areas since 2006.
2. Fishermen also capture turtles during fishing with nets and angling. Some turtles are accidentally killed with nets, whereas some fishermen considered them the enemies of fish, therefore, they kill the captured turtles to save their fish.
3. Dogs were observed wondering extensively during canal closure in search of food. These dogs eat dead fish, tapped fish and turtles in shallow water.
4. During fish capturing operations by local peoples turtles are also captured and occasionally killed.

5. Hibernated turtles are either killed or removed from their natural habitat and shifted with silt where their lives are on risk during de-silting of canals.
6. Running water maintains body temperature of turtles. Turtles face severe cold condition due to unavailability of water and shortage of food which is harmful to turtles when canals are closed.
7. The maturity of turtles reaches late in their lives and they reproduce slowly. The species survival is possible if it survives for a long period.
8. Nesting sites of freshwater turtles are not protected and the wild animals such as monitor lizards, dogs and jackals eat their eggs and even children break down these eggs.

Fishermen also use various harmful and unsustainable techniques such as dynamite explosion, electric shocks and Pesticide for fishing. This is also a reason that the population of freshwater turtles are decreasing from the area.

4. Conclusion

The present study shows that seven species of freshwater turtles are found in district Charsadda of Pakistan, in which Indian mud turtle (*Lessy mes punctata*) is predominantly exists in the study areas while *Hardella thurjii* is very rare in Charsadda. The population status of *Nilssononia gangatica* and *Nilssononia hurum* is also good in Charsadda. It is concluding that freshwater turtles are very important natural resource of the country, which are being ignored and wasted. To manage this situation and preserve turtle populations into future, it is necessary to provide legal protection/coverage immediately under the NWFP Wildlife (Protection, Conservation, Reservation and Management) Act, 1975, otherwise this natural resource will be destroyed by the local peoples and Species will ultimately extent.

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