

**STUDIES ON POPULATION STATUS OF FRESHWATER  
TURTLES AT SELECTED WETLANDS.**

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## SUMMARY

Fresh water Turtles are among the most important groups of the wetlands associated biodiversity. Eight species of freshwater Turtles are found in Pakistan. These include *Chitra indica*, *Geoclemys humiltoni*, *Aspideretes gangeticus*, *A hurrum*, *Lissemys punctata*, *Kachuga smithi*, *K. tecta* and *Hardella thurgi*,

Keeping in view importance of the Turtles a survey for study of distribution pattern and population status of freshwater turtles was conducted. Four riverine wetlands were visited in this regard. These include Chashma Barrage, Taunsa Barrage, Ghazi Ghat and Head Punjned 6 species of Turtles were recorded in the survey. These include *Chitra indica*, *Aspideretes gangeticas*, *Aspideretes hurrum*, *Kachuga smithi* *Geoclemys humiltoni* and *Lissemys punctata*.

*Kachuga smithi*, *Aspideretes gangeticus* and *Geoclemys humiltonii* were found at all the three sites. *Chitra indica* was recorded at three sites including Taunsa Barrage, Ghazi Ghat and Head Punjnad while *A hurrum* was found only on head punjnad. Capturing of Turtles for trade is major threat to the Turtles species. Other threats include accidental killing in fishing nets and by anglers etc. Potential threats include closiur of canals destruction of nests and pollution.

## **1. INTRODUCTION**

### **1.1 Background**

The Indus River and allied areas supports a large diversity of fish and wildlife, including amphibians, reptiles, birds and mammals. With the passage of time, some of the species of wildlife have become rare and threatened and yet are facing a number of ecological problems and threats which are needed to be addressed for their conservation.

Freshwater Turtles are among the most important groups of the wetlands associated biodiversity. Eight species of Fresh water Turtles are found in Pakistan. These include *Chitra indica* (Narrow-headed Soft-shell Turtle), *Geoclemys hamiltonii*, (Spotted Pond Turtle) *Aspiderites gangeticus* (Indian Soft-shell Turtle), *A hurum* (Peacock Soft-shell Turtle), *Lissemys punctata* (Indian Flap-shell Turtle), *Kachuga smithi*; (Brown River Turtle) *K.tecta* (Indian Saw-backed Turtle) and *Hardella thurgi* (Brahminy River Turtle).

One species of FWT is categorized as endangered, five species are vulnerable and two species are at low risk in IUCN Red Data List (2003). In addition, 4 species have been included in Appendix-I of the CITES and 3 species in Appendix II (Anonymous, 2005), while *Hardella thurgi* (Brahminy River Turtle) is the only non-CITES species (Anonymous, 2005).

At present, current distribution and status of turtles and threats to them are not well determined or otherwise much generalized and very fragmented information is available regarding the distribution patterns and status of turtles species in the country.

In addition, habitat preference and hotspots areas of occurrence of different species are not well known. Detailed studies are also needed to determine the threats and ecological problems to the species.

Considering importance of the Turtles a Joint project with W.W.F. Pakistan as “Distribution Status of Turtles in selected area of Indus River System” has been included. Objectives of the project are as follows.

- i. Study the distribution pattern and status of freshwater turtles in selected water bodies.
- ii. Undertake studies on the habitat requirements of the species.
- iii. Investigate threats to the species and their habitat.

In this context 3 sides of the Indus river including. In this context, for wetlands were surveyed for study of status of the turtles. These include Chashma Barrage, Taunsa Barrage, Ghazi Ghat and Head Punjnad.

In addition to turtles Avian and Mammalian species were also recorded.

Despite of the significance of the freshwater turtle very little and fragmented studies have been conducted in freshwater turtle, Minton (1966) published a book entitled “Herpetology of Pakistan” and described known distribution of the Reptiles of Pakistan including turtles. Khan and Mirza (1976) presented a “Key and Checklist of Reptiles – Chelonia” including distribution of turtles in Pakistan. Galib et al (1981) published “Checklist of Reptiles of Pakistan including know distribution. Azam et al (2005) presented a paper entitled “Some observations on the distribution and abundance of freshwater turtles in river Indus”.

During present study some important areas of Chenab River were visited from study of population of the turtles and threats to their population.

## 1.2 Study Area

### i. Chashma Barrage

Chashma barrage (32° 31' N, 71° 29' E) is located about 25 km southwest of Mianwali on Mianwali Dera Ismail Khan Road. This wetland comprises of a large barrage on the river Indus with a series of embankments (flood-bunds) which divide the wetland into five large lakes. Depth of these lakes vary from 0.2 m during the dry season and 8 m in the monsoon floods while the depth of the main river varies from 4.6 m to 8.8 m. Considering the importance of this wetland it was declared as wildlife sanctuary and categorized as a Ramsar Site.

The aquatic vegetation consists of *Hydrilla verticillata*, *Nelumbium speciosum*, *Nymphaea lotus*, *Typha angustata*, *Phragmites karka*, *Potamogeton pectinatus*, *Saccharum spontaneum*, *Vallisneria spiralis* and *Zannichellia palustris*. Terrestrial vegetation around wetland is a mixture of subtropical semi-evergreen scrub and tropical thorn forest which is dominated by *Olea ferruginea*, *Acacia modesta*, *A. nilotica*, *Adhatoda vasica*, *Dodonaea viscosa*, *Tamarix aphylla*, *T. dioica*, *Zizyphus mauritiana*, *Z. nummularia*, *Chrysopogon aucheri*, *Lasiurus hirsutus*, *Heteropogon contortus* and *Panicum antidotale*. 5 km downstream of the river and lakes in the upstream main reservoir were surveyed.

### ii. Taunsa Barrage

Taunsa Barrage is located at 3042 N 7050 E 20 km southwest of Kot Audu Mazaffargarh district Punjab.

The site has a large water reservoir behind a barrage on the Indus River. Five embodiments project out into the reservoir and retain shallow lagoons as the water level in main river channel falls. The depth in the main channel varies from 5.0-11.5 m dependence on flowed level while in the seepage lagoons varies from 0.2 – 50. m. The ph value is 6.5 to 7.0. Main river is almost without aquatic vegetation exapt light reed vegetation Aquatic vegetation in the seepage lagoons is comprised of *Hydrilla verticillata*, *Nelumbium spciosum*, *Nymphaea lotus*, *Phragmites karka*, *Potamogetion*

*crispus P.pectinatus, Ranunculus aquatilis, Sacchurum spontaneum , Vallisnaria spirales, Zonichellia palustris and Typha angustata.*

**iii. Head Punjad:**

Head Punjad is located at 20 km south of aupal district Muzaffargarh. Two rivers Chanab and Sutlage meets at the upstream of the Head works. The Head works have a water reservoir at upstream and three canals arise from the left bank of the river. These included Punjad canals, Abbasi canal and Abuzabi canal.

The river water main river is lacking submerged vegetation. However there is reed vegetation, comprising *Sacchurum spp, Typha angustata* and *Phragmites karka* on the margins. Embankments have large trees of *Ziziphus jujuba* and *Acacia nilotica* which provide good roosting sites for the birds. There is also light reed vegetation along canals which are habitat of a number of passerine species. 5 Km upstream of river, 3 Km downstream and 3 Km of the canals were surveyed.

**iv. Ghazi Ghat**

Ghazi Ghat is situated about 15 km south of D.G. Khan bridge on the Indus river on Multan D.G.Khan road. The wetland consist of main river and a bang lake on upstream of right bank on the old path of river Indus.

**1.3 Species Account**

**i. Kachuga smithii**

*Kachuga smithii*, is a hard shell turtle. Carapace viewed from above ovoid, widest strongly arched, highest at mid period. Plastron broadly and rigidly articulated with carapace. Tail of adult male slightly more fleshy than this of female.

Carapace olive brown, central ridge dark brown to black, Plastral laminae, and lower sides of marginal black or dark brown bordered with yellow, head light olive to pale



grayish yellow, a ruddy tinge temporal region, neck with faint cream stripes, limbs pale grey.

The turtle is common in rivers, and in the large canals and is occasionally found in lakes and ponds. It frequents muddy water with some current .This is the only species of turtle found in Pakistan which has habit of social basking. The basking turtles are highly alert. In captivity they have been found omnivores preferring insects.

**ii. Aspideretes gangeticus**

It is a large sized turtle feed in Gangas, Indus and Mahandi river system to Nepal, Oressa and Bengal.

Carapace viewed from above is oval in adults in almost circular in young, widest near mid pond, carapace and plastron smooth in adults carapace with fine tuberculate. Head broad and massive, proboscis stout and moderate length, tail black and fleshy.

Carapace of adult dull olive to green unmarked or with black reticulation, plastron ivory head and limbs. greenish, with black spotting, head in some with black oblique strips, young bright green , with fine intricate black reticulated.

These big sized turtles inhabits rivers and large canals particularly where water is turbid with some current and mud bottom. These turtle do not ordinary inhabit lakes and small water bodies.

**iii. Aspideretes hurrum**

*Aspideretes hurrum* is distinguished by its olive green disc with reticulation. The head is marbled with dark green or black lines. The species is present in Indus river system but is reported to be rare in Pakistan.

It is found in rivers, streams, lakes and ponds with loamy bottom and is omnivorous. Illegal trade of its body parts is one of the major threats to the population of the Indian Peacock Softshell Turtle.

These turtles are plentiful in shallow muddy ditches, lakes and marshes. They are often found in situations that are dry for longer periods.

These turtles are frequently found swimming largely in quite shallow water or basking on the bank. They are less alert.

**iv. Lissemys punctata**

It is relatively smaller in sized. Carapace viewed from above broadly oval in adult to circular in young' margin of carapace smooth, slightly flared posteriorly, pair of large flaps over hind limbs and smaller flaps over tail, head large claws large and heavy & tail very short in both sexes.

Color light, olive brown, with numerous round spots of dull yellow, carapace narrowly edged with pale yellow plastron, Head and limbs grey, with light yellow spots, yellow spots on head and neck. Old juvenile and young adults with more vivid yellow spots and dashes on carapace.

Large adult dark olive brown, with irregular dull yellow ocelli edged with black and many small yellow dots.

This species seems to be more restricted in habits than the Indian shell and is confined to sandy section of the Indus and other large rivers.

**v. Geoclemys hamiltoni**

Carapace oblong, widest near midpoint, strongly arched and highest a little anterior to mid point, margin not flared or serrate, heavy ridge on each central lamina, farming

three serrate keels 24 marginal, head large and massive in adult, snout barely projecting beyond lower jaw. Tail short in both sexes.

Carapace black, with more or less wedge shaped, yellow mark more prominent on central & marginal and more numerous and vivid in young, largest adults may be almost uniformly blackish, each lamina with a pattern of more or less radically arranged spots, Head black with irregularly arranged, round yellow spots largest on side of snout and behind eye, throat spotted like head, limbs dark grey to black, spotted with yellow.

vi. **Chitra indica**

This species is generally similar to that of *Aspideretes gangeticus*. Head long narrow, rather flat, eyes dorsolateral. Proboscis very short, nostrils small nasal septum without lateral ridge, limbs more flapper like and nails shorter than those of *A.gangeticus*. Reported to be one of the largest Freshwater turtles.

It is pale bluish grey, with dark grey reticulation on the dorsal surface. Plastron ivory, heads and limbs of same color as disc, faint, yellowish dark edged.

## 2. MATERIALS AND METHODS

Different methods were used for study of population of fresh water turtles and birds.

1. Turtles emerging for Sun basking at the banks of the rivers and canals were observed and counted. For this purpose transect count method was used. Transacts of 1 km were selected randomly along the rivers channels and canals and basking or floating turtles were observed and counted.

2. Drag nets were also used for collection of turtles and study of there occurrence and abundance.



3. Turtles were observed identified and counted with the help of binoculars (Olympus 8.16 x 40 DSP I) and spitting scope. (Nikon w/15-45V). The GSP Magmallian sport rack was used to record coordinates.

### 3. RESULTS AND DISCUSSIONS

Six species of turtles were found at different sites during the survey. These include *Chitra indica*, *Aspideretes gangaticus*, *A. Hurrum*, *Lissymus punctata*, *Kachuga smithi* and *Lissymus punctata*.

*Kachuga smithi* was found most abundant species being 55.65 % of the recorded specimens. Other species were *Chitra indica* 3.48 %, *Aspideretes gangaticus* 11.88 %, *Aspideretes hurrum* 3.48 % *Geoclemys hamiltonii* and *Lissymus punctata* 7.25 %. *Kachuga smithi*, *Aspideretes gangaticus*, *Geoclemys hamiltonii* were found at all the four surveyed sites. *Chitra indica* was recorded at three sites including Taunsa Barrage, Ghazi Ghat and Head Punjnad and *A. hurrum* was found on only one site Head Punjnad.

*Kachuga smithi*, was most abundant species being 55.65 % of the counted turtles. *Geoclemys hamiltonii* was 18.26 % *Aspideretes gangeticus* 11.88 % *Lissemys punctata* 7.25 % *Chitra indica* 3.48 % and *Aspideretes hurrum* 3.44 %.

#### i. Chashma Barrage

Four species of Turtles were recorded from Chashma Barrage. These include *Kachuga smithi*, *Aspideretes gangeticus*, *Geoclemys hamiltonii*, and *Lissemys punctata*.

*Geoclemys hamiltonii* was found relatively more abundance in being 46.39 % (45) of the total counted 97 turtles. *Kachuga smithi* was second abundant species which was 39.17% *Aspideretes gangeticus* and *Lissemys punctata* both were 7.22 % (7).

As the abundance was studied in two different habitat types, in main river and in lakes different composition was found in these two habitat types.

*Geoclemys hamiltonii* was much abundant in the lakes while *Kachuga smithi* was relatively common on the main river.

As the site has 5 large lakes, it is a viable site to support a good population of *Geoclemys hamiltonii*.



It is reported that turtles have been captured in the past from the site but now Punjab wildlife Department has stopped this practice to some extent with the Cooperation of Fish contractor.

However some nomads communities involved in capturing of turtles are present at few km down of Chashma Barrage near Piplan and yet involved in this process.

## **ii. Taunsa Barrage**

5 species of turtles were found at Taunsa Barrage of these *Kachuga smithi*, was found most abundant having 62.72% (74) of the total seen turtles. Rest of the 4 species were found with smaller numbers. *Chitra indica* 4.24% (5), *Aspideretes gangeticus* 16.10% (19), *Geoclemys hamiltonii* 8.47 % (10), *Lissemys punctata* 8.47 (10). Ghalib etal (1976) reported six species of Turtles at Taunsa Barrage which include *Kachuga smithi*, *Kachuga tecta*, *Lissemys punctata*, *Aspideretes gangeticus*, *Geoclemys hamiltonii*, and *Hardella thurge*, *Kachuga tecta*, and *Hardella thurg* could not be recorded in present survey but *Chitra indica* which is an endangered species was recroded which was not reported by Ghalib etal (1976) at the site.

It is reported that there had been high pressure of capering of turtles at the site in past few year but now it has been reduced to some extent but yet occasions of capering of turtles are reported.

It was found that down stream of the barrage is best to provide sandy banks for basking and nesting for turtles. In upstream about two kilometers of the main river do not have such good sandy beaches which are viable for basking and nesting of turtle.



In the ponds area between embankments ponds and lakes have small population of turtles. Adjacent area is mostly muddy not sandy which is not good for nesting of turtles. So downstream of the barrage has much viable habitat for species like *Kachugh smithi*, *Aspidirites hunun* and *Chitra indica* etc.

Banks of the D.G Khan and Kachi Canal also have good basking sites and *Kachigh smithi* are found abundant on these banks.

### iii. Ghazi Ghat

5 species of turtles were recorded at Ghazu Ghat. These include *Kachuga smithi*, *Chitra indica*, *Aspideretes gangeticus*, *Geoclemys hamiltonii*, and *Lissemys punctata*. *Kachuga smithi* was relatively more common species 61.11 % of total counted turtles. Other found species were *Aspideretes gangeticus*, 13.89 %, *Geoclemys hamiltonii* 11.11 %, *Chitra indica* 8.33 % and *Lissemys punctata* 5.58 %.

Skeleton of the dead turtles were found which are evidence of capturing of the turtles from the site. It was also reported by the local people that turtles has been kept from the site in the past.

Both upstream and down steam of Ghazi chat has fast flowing water with sandy banks and provide good bashing and nesting areas. There is a big lake on the right bank which also has good population of mix species found at the site.



#### iv. Head Punjnad

6 species of turtles were recorded at Head punjnad. These were *Kachuga smithi*, *Aspideretes gangeticus*, *A.hurrrum*, *Chitra indica* *Geoclemys hamiltonoi* and *Lissemys punctata*. *Kachuga smithi* was found most common species which was 59.79% of total count. *Aspideretes hurrrum* was second abundant species being 12.37 %, *Aspideretes* was 10.31 %, *Geoclemys hamiltonii* 7.22 % and *Lissymus punctata* 6.19 %.

Occurrence of *Aspideretes hurrrum* and *Chitra indica* at the site was important. *Aspideretes hurrrum* was not included in the “Herpetological fauna of Pakistan” by Minton (1966) nor it was reported by Ghalib etal (1976). Its distribution in the country is not known. So its accurence at the site is notable and contribute information regarding its distribution. Presence of *Chitra indica*, an endangered species of reptiles was also notable. Capturing of turtles from the adjacent areas of Head Punjnad is reported to be usual.

Downstream of Head Punjnad has good basting and nesting sites at the banks of the river. In the upstream there is dense reed vegetation at more the 2 Kilometer at the margins of both river Chenab and Sutlaj which are joining at the site. Though turtles are found with good number in this area, yet it is not good enough for basking.



### 3.2. STATUS OF IMPORTANT SPECIES.

#### *i. Aspiderites Hurrum*

*Aspideretes hurrum* is an extremely rare species of Freshwater turtles found in the country. It has not been included in the list of reptiles recorded in the country by Minton (1966) and Ghalib et al (1976) Khan. (1976) reported it from Sind. During present survey it is found that *Aspiderites hurrum* is found at Head Punjnad with good numbers. Detail survey of Chanab river will be under taken to study distribution pattern and assess the population of the species.

#### *ii. Chitra indica*

*Chitra indica* is a globally endangered species. Minton (1966) stated that distribution of *Chitra indica* include all the lower and middle Indus velay but definite records are few. Ghalib etal (1976) reported it from Sind (near Thatta). Azam (2003) found the species common in the areas of Indus river in sind between Guddu Barrage and Sukhar Barrage.

During present surveys species has been recorded from Taunsa Barrage and Head Punjnad.

#### *iii. Kachuga smithi*

Minton (1966) stated that this turtle is common in river channels and in the larger canals and is occasionally found in lakes and ponds communicating with the river. It is only turtles species found in Pakistan given to the sort of social basking. Ghalib etal (1976) found it widely distributed and reported it from Dadu, Sanghar, Larkana, Thatta, Hyderabad and Sukkur districts of Sind and from Taunsa Barrage and Head Marala in Punjab.

During present studies it has been found most abundant species on three study sites including, Taunsa Barrage, Head Punjnad and Ghazi Ghat while at Chashma barrage it was second abundant species.

iv. **Geoclemys hamiltonii**

Minton (1966) states that in Pakistan it occurs in the Indus Valley from Jacobabad south to Saidabad and on the basis of the right record in the upper Hab River also reported for Tharparkar. Shalib et al (1976) reported it from Balloki, Head Qadirabad, and Taunsa Barrage.

v. **Lissymus punctata**

Minton (1966) stated that *Lissymus punctata* occurs in the Indus and Ganges river system from NWFP to Sikkim and south to Kutch and East Bengal. In Pakistan it is most widely distributed than any other species. Evidences of its occurrence have been found from Rawalpindi down to Indus Delta.

Ghalib et al (1976) reported it from in Drayage in Dadu, Hyderabad, Sanghar, Sukkur Thatta, Jacobabad District in Sind, Rawalpindi, Lahore and D.G Khan Districts in Punjab and Dera Ismail Khan district in N.W.F.P.

During present studies it has been recorded with small numbers at all the study sites.

According to Minton (1966) they occur in main channels of rivers and in large canals but are not plentiful. As the study areas were mainly riverine areas the recorded population was very low.

### **3.3. Threats**

1. There is high demand of Freshwater turtles as found in China, Japan and some other countries of South-East Asia. This has resulted in high level of cross boundary trade which is illegal as export of turtles is not allowed due to obligations of CITES and threatened status of species. It was observed and reported during the survey that turtles are under severe threat of illegal trade. In this trade local fisher men of the some areas and some Nomads communities are involved. Traders come from cities i.e Lahore etc and get captured turtles from these peoples. It is reported that this trade has increased in the past

few year and now it is a sever threat to the turtles population. Capturing of turtles has been recorded and reported at all the sites.

2. Turtles are also victim of accidental mortally in the fishing nets and angling.
3. Sudden closure of canals deprives the turtles from their habitat. They emerge form the canals and spread in the surrounding areas. Here they become victims of road accidents or/lack of habitate and unsuitable environmental conditions becomes fatal for them.
4. Pollution is also a threat to the turtles population which may affect turtles population yet in the areas studied this has not been found a serious threat.

**Abundance of Turtles Species at Taunsa Barrage**

Species	Main River	DG Khan Canal	TP Link Canal	Canal	Pond	Total	Percentage
<i>Kachuga smithi</i>	28	21	7	18	5	74	62.72
<i>Chitra indica</i>	2	-	-	3	-	5	4.24
<i>Aspdirites gangeticus</i>	5	3	5	4	2	19	16.10
<i>Geoclemys hamiltonii</i>	4	2	00	1	3	10	8.47
<i>Lissemys punctata</i>	3	2	-	-	5	10	8.47
	42	28	12	26	15	118	100

Table: 1 Abundance of Turtles Species at Taunsa Barrage

**Abundance of Turtles Species at Chashma Barrage**

Species	Main River	Lake	Total	Percentage
<i>Kachuga smithi</i>	23	15	38	39.17
<i>Aspdirites gangeticus</i>	4	3	7	7.22
<i>Geoclemys hamiltonii</i>	7	38	45	46.39
<i>Lissemys punctata</i>	2	5	7	7.22
<b>Total</b>	<b>36</b>	<b>61</b>	<b>97</b>	

Table: 2 Abundance of Turtles Species at Chashma Barrage

**Abundance of Turtles Species at Ghazi Ghat**

<b>Species</b>	<b>Main River</b>	<b>Lakes</b>	<b>Total</b>	<b>Percentage</b>
<i>Kachuga smithi</i>	13	9	22	61.11
<i>Chitra indica</i>	2	1	3	8.33
<i>Aspdirites gangeticus</i>	3	2	5	13.89
<i>Geoclemys hamiltonii</i>	1	3	4	11.11
<i>Lissemys punctata</i>	-	2	2	5.58
	<b>19</b>	<b>17</b>	<b>36</b>	<b>100</b>

Table: 3 Abundance of Turtles Species at Ghazi Ghat

**Abundance of Turtles Species at Head Punjnad**

<b>Species</b>	<b>Main River</b>	<b>Canal I</b>	<b>Canal II</b>	<b>Total</b>	<b>Percentage</b>
<i>Kachuga smithi</i>	28	18	12	58	59.79
<i>Aspdirites gangeticus</i>	7	2	1	10	10.31
<i>A hurrum</i>	4	3	5	12	12.37
<i>Chitra indica</i>	3	1	-	4	4.12
<i>Geoclemys hamiltonii</i>	3	2	2	7	7.22
<i>Lissemys punctata</i>	2	3	1	6	6.19
	<b>47</b>	<b>29</b>	<b>21</b>	<b>97</b>	<b>100</b>

Table: 4 Abundance of Turtles Species at Head Punjnad

**Abundance of Turtles at Different Sites**

<b>Species</b>	<b>Chashma Barrage</b>	<b>Taunsa Barrage</b>	<b>Ghazi Ghat</b>	<b>Head Punjnad</b>	<b>Total</b>	<b>Percentage</b>
<i>Kachuga smithi</i>	38	74	22	58	192	55.65
<i>Chitra indica</i>	0	5	3	4	12	3.48
<i>Aspdirites gangeticus</i>	7	19	5	10	41	11.88
<i>A hurrum</i>	0	0	0	12	12	3.44
<i>Geoclemys hamiltonii</i>	45	10	4	4	63	18.26
<i>Lissemys punctata</i>	7	10	2	6	25	7.25
<b>Total</b>	<b>97</b>	<b>118</b>	<b>36</b>	<b>94</b>	<b>345</b>	

Table: 5      Abundance of Turtles Species at Different Sites

**Abundance of Turtles Species at Taunsa Barrage**

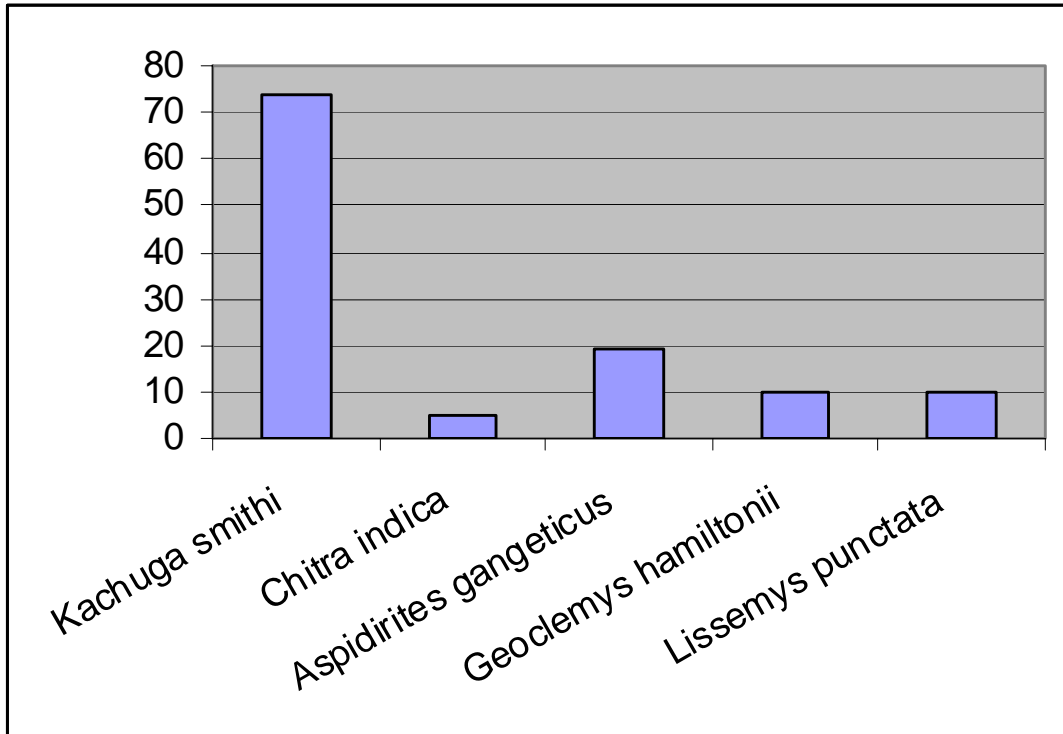


Fig-1 Abundance of Turtles Species at Taunsa Barrage

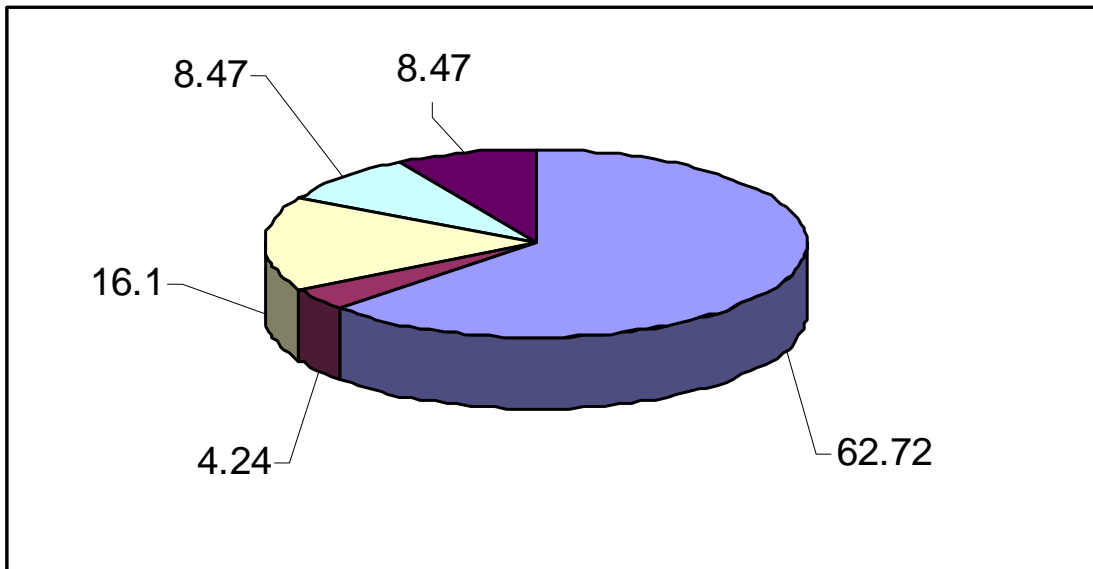


Fig-2 Frequency of Turtles species at Taunsa Barrage

**Abundance of Turtles Species at Chashma Barrage**

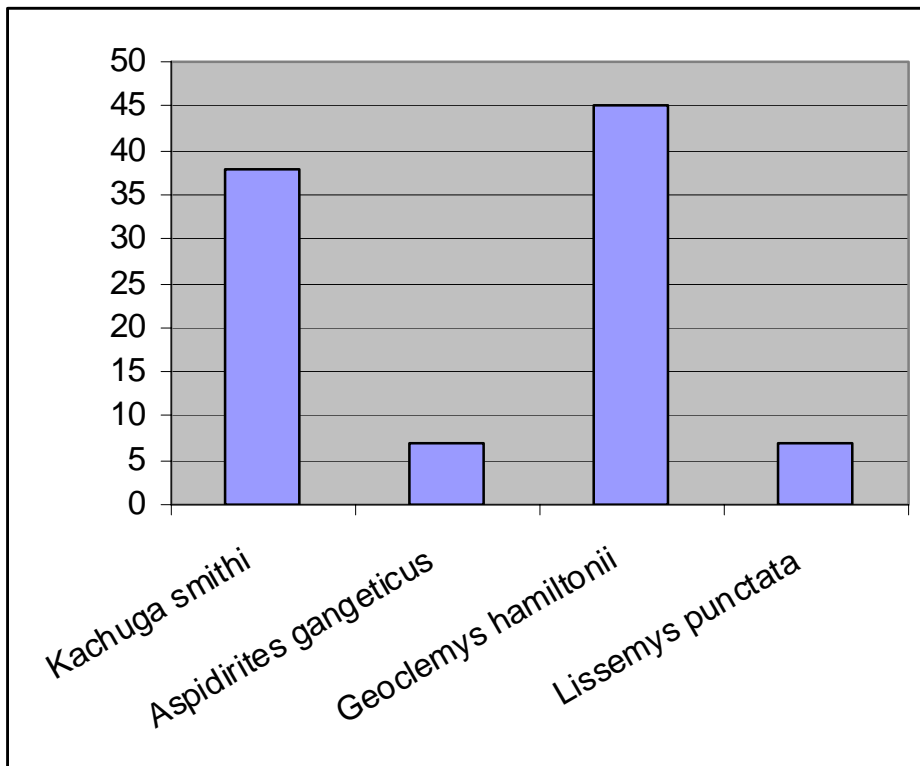


Fig-3 Abundance of Turtles Species at Chashma Barrage

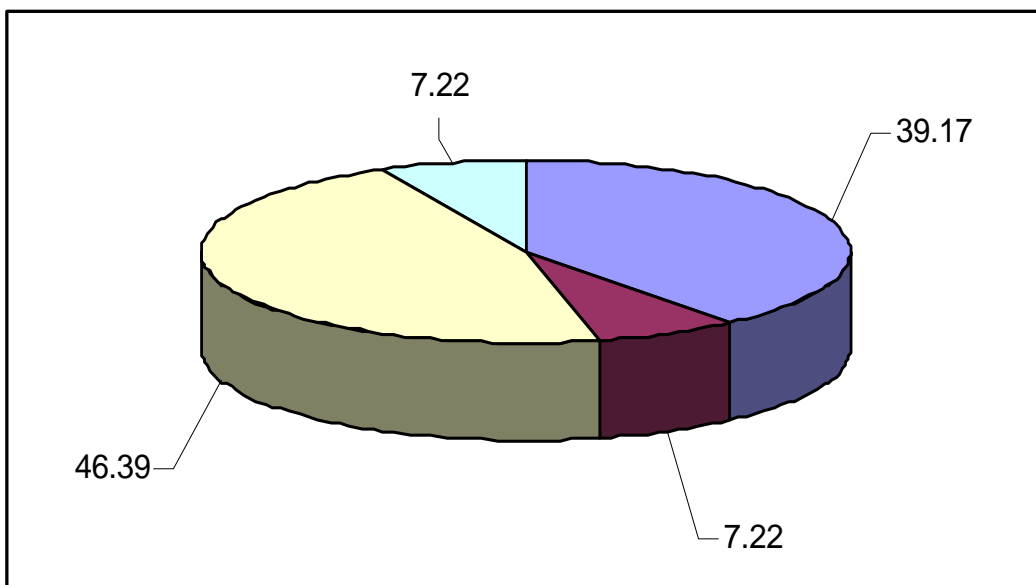


Fig-4 Frequency of Turtles Species at Chashma Barrage



**Abundance of Turtles species at Ghazi Ghat**

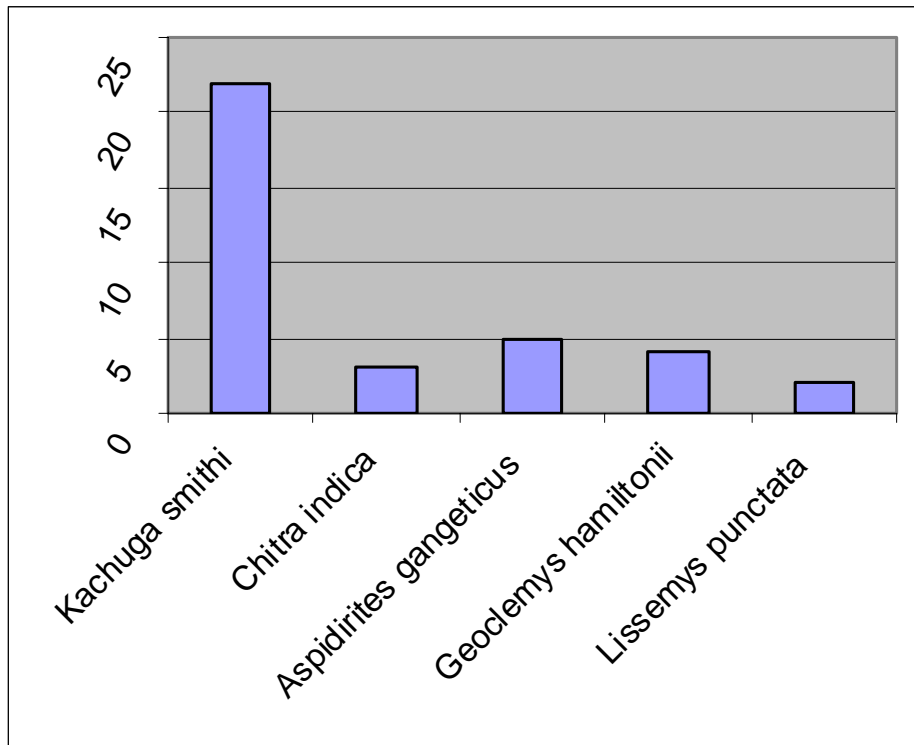


Fig-5 Abundance of Turtles Species at Ghazi Ghat

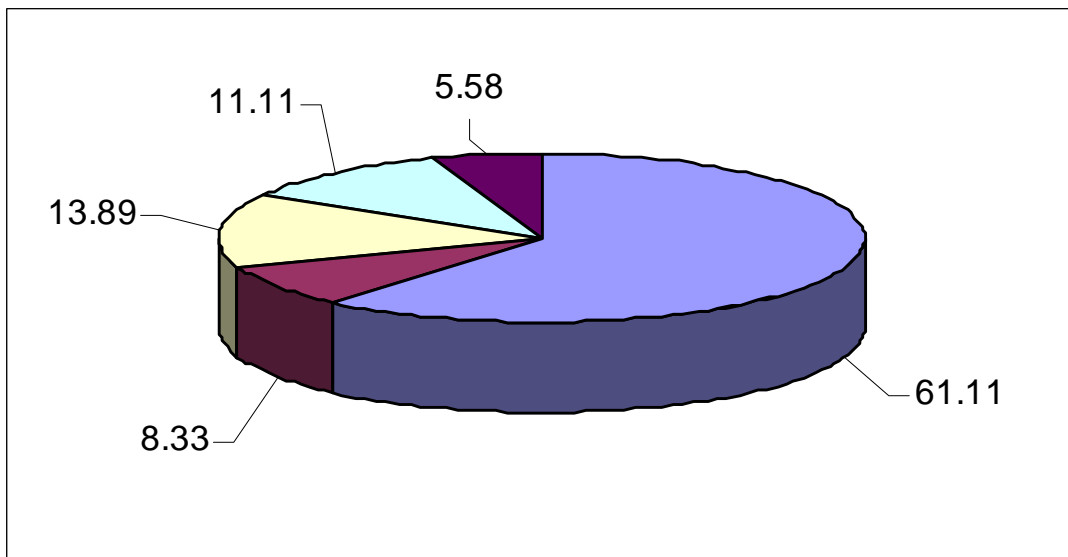


Fig-6 Frequency of Turtles Species at Ghazi Ghat

**Abundance of Turtles species at Head Punjnad**

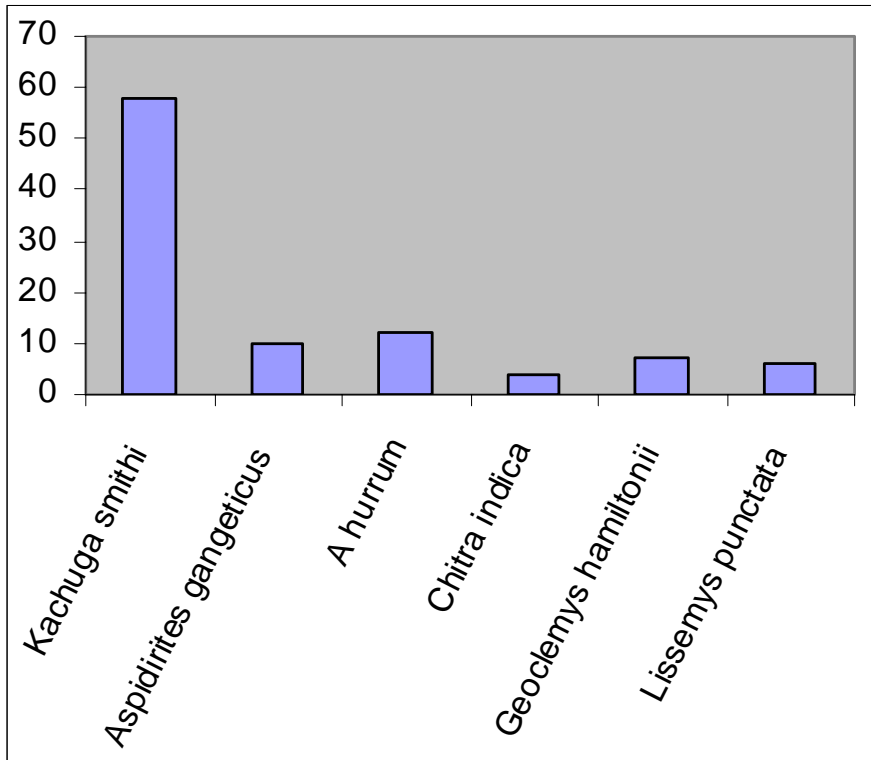


Fig-7 Abundance of Turtles Species at Head Punjnad

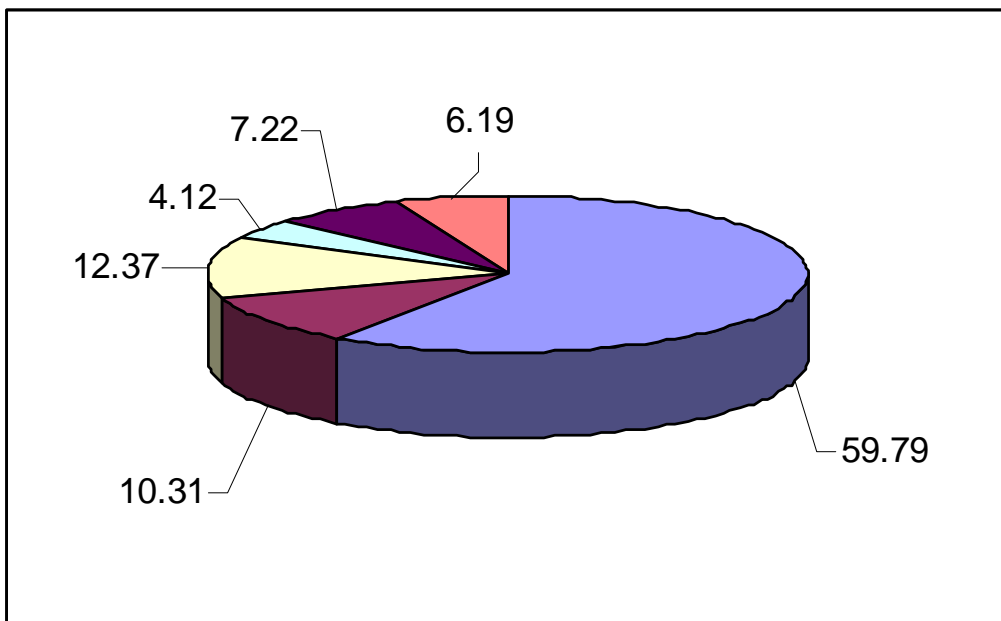


Fig-8 Frequency of Turtles Species at Head Punjnad

**Abundance of Turtles species at Different Sites**

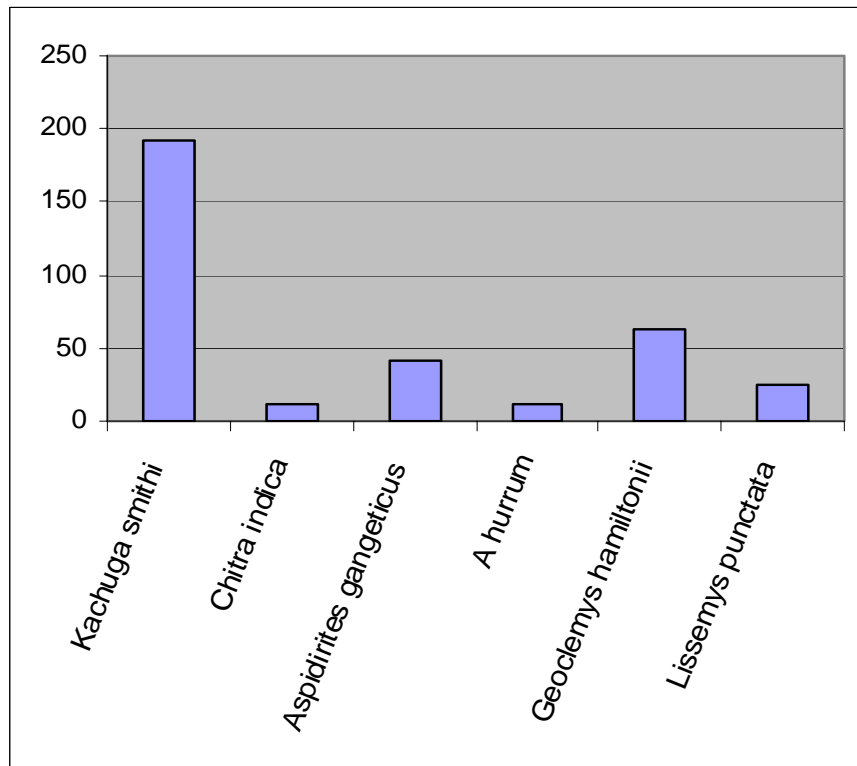


Fig-9 Abundance of Turtles Species at Different Sites.

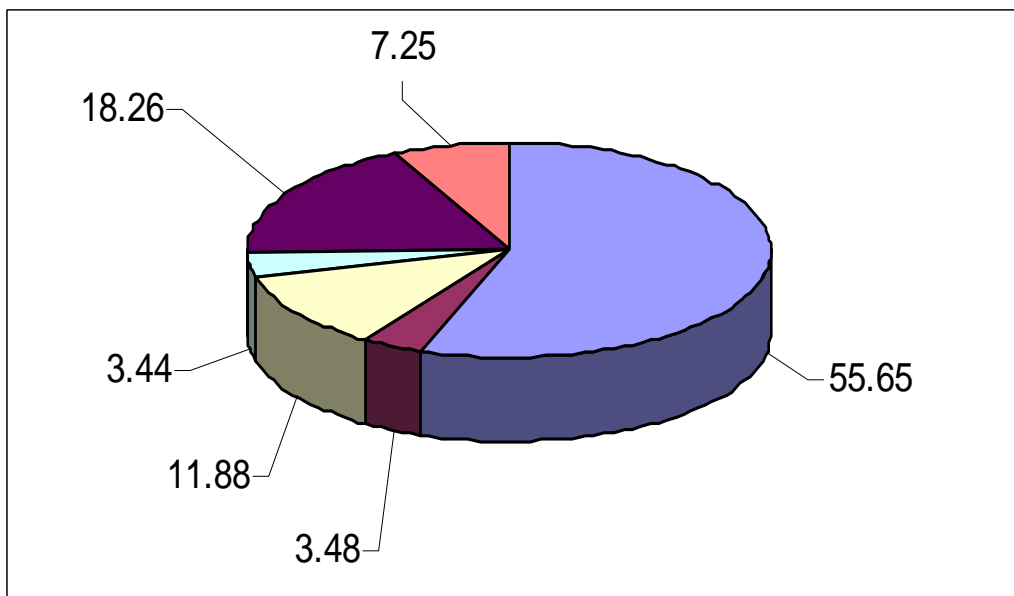


Fig-10 Frequency of Turtles Species at Different Sites.

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