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Inventorization of Chelonian species of Dhubri district of Assam

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ABSTRACT

Chelonian is the most primitive poikilothermous animals, amphibious in nature and have adapted to various ways of life. The present study inventorization of chelonian species of Dhubri district, Assam indicates that the district is very rich in turtle diversity. The study revealed that the district has 10 species of turtles, 6 belong to Geomydidae family and 4 belong to Trionichidae family. Among these 10 turtle species 2 species belongs to endangered category and 4 species belongs to vulnerable category. The turtle species of the district were under tremendous pressure from overexploitation, habitat loss and other anthropogenic problems. Therefore they were in urgent need of conservation measure for their survival.

Key words: Diversity, Geomydidae, Trionichidae, Diversity, Conservation

INTRODUCTION

Chelonian is the most primitive poikilothermous animals, amphibious in nature and have adapted to various ways of life. Turtles belong to order Testudines of class reptelia. Currently there are 322 species and 119 additional subspecies or 441 total taxa of living turtle and tortoises including seven marine and 315 species of freshwater and terrestrial turtles (Van Dijk *et al.,* 2012) most of which are tropical in distribution, with some notable temperate exceptions in the southeastern United States. The highest number of species occurring in Asia (41 genera and 98 species), and other major tropical areas having between 18 and 23 genera and from 50 to 58 species (Ernst and Barbour, 1989; King and Burke, 1989; Iversion, 1992; Orenstein, 2001; Bonin *et al.*, 2006; Rhodin *et al.*, 2008; Wyneken *et al.*, 2008; Vitt and Caldwell, 2009).

The studies on the diversity and conservation of turtle fauna in Northeastern region have been done by Talukdar (1997), Vijaya (1983), Das (1991), Choudhury (1995), Pawar and Choudhury (2000), Sengupta *et al.,* (2000), Praschag and Gemel (2002), Fritz *et al.,* (2008), Das and Gupta (2011) and Deka and Saikia (2015).

Dhubri district of Assam is very rich in habitat for turtles including the mighty river Brahmaputra and many wetlands but no present data about turtle species, its conservation status was available. Therefore the present study has been deigned to find out the diversity and distribution of turtle fauna in Dhubri district to initiate the conservation measures. The main objectives of the present study were as follows:

- To investigate the diversity and distribution of turtle species of Dhubri district.
- To study the habitat types of turtle species.
- To investigate the conservation threats of turtle species and to evaluate the conservation strategies.

Materials and Methods

Study area:

Physiography and location:

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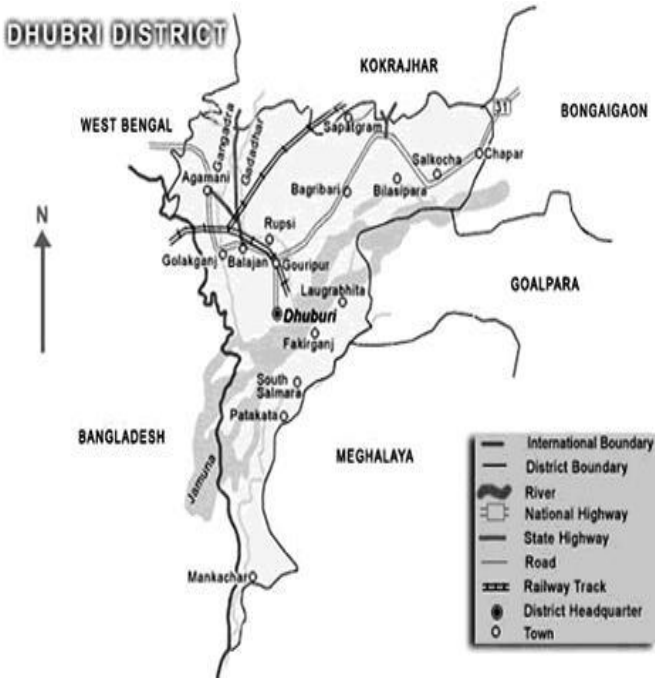
The study area Dhubri district is situated in the western most corner of Assam, between latitudes 25^0 $28^/$ and 26^0 $01^/$ North and longitudes 89^0 $59^/$ and 90^0 $28^/$ East and 35 meter above mean sea level. The District has total geographical area of 2838 sq. Kms. and it is bounded by Kokrajhar District in the North, Bongaigaon & Goalpara district in the East, Meghalaya in the South and West Bengal and Bangladesh in the West. General topography of Dhubri district is plain with patches of small hillocks like Tokorabandha, Dudhnath, Chandardinga, Boukumari, Boropahar, Chakrasila etc. are situated in the north eastern part of the district. Mighty river Brahmaputra is flowing through this district from east to west dividing the district into two distinct parts north bank and south bank. The river has innumerable tiny islands (Char) created due to frequent change of its course. There are many other rivers like Champabati, Gourang, Gadadhar, Gangadhar, Tipkai, Sankosh, Silai in the north bank and Jinjiram and Kalo in the south bank. The district is also very rich in wetlands and marshy areas like Dheer Beel, Diplai Beel, Chanda khola Beel and Soreswar beel, dhaloni beel and Hakama beel etc.

Figure-1. Study site



Climate and rainfall

The climate of the district is sub-tropical in nature with very damp, warm and humid during summer and dry and cool during winter. June and July are the months with highest rainfall. Annual rainfall is between 200cm to 400 cm. The rain fall pattern observed dry during November to March with an average annual rain fall of 9.5 cm only. The temperature in the region begins to increase from end of February and reaches highest point during June and July. January is the coldest month of the year. The temperature throughout the year generally varies between 8 °C to 30 °C. The air is highly humid throughout the year and winds are light in the district.

The topography of the district is very peculiar with many rivers, small ranges of hillocks as well as several natural depressions and greater part of the district is plain. The soil of the district varies from loamy to sand loamy and some of the areas have clay to heavy clay soil. The soil is mainly acidic in nature ranging from pH 5.6 to pH 6.5.

Vegetation type

The study area comprises with moist deciduous and semi-evergreen forest. The flora ranges from willow type long grasses to shaygy under growth. The herbs are mainly of mixed jungles of *Eupatorium odoratum, Lantana camera* and *Coffea robusta* which mainly grow along the hill slops. Among the grasses, varieties of bamboo is very common along with hilly banana tree mostly dwarf variety. The other important plant varieties include *Shorea robusta, Tictona grandis, Careya orborea, Leyerstroemia spp., Kydia calycina, Terminalia belericea, Termilia chebulo, Cassia fistula, Albizzia spp, Stereo spermum, Delberzua spp, Shorea anamica and Ficus spp* etc. The study area is also rich in various aquatic and semi aquatic vegetation such as *Panicum spp, Vossia, Hygrorhiya, Arundo, Erianthus, Crotopteris, Azola, Salvinia, Marstia, Chromalocna, Odorata, Vernonia cinerca, Ageratum conyzoids, Barringtonia, Cephlanthus and Clinogyne* etc.

Methods for taxon sampling

Extensive survey of turtle species has been carried out in the Dhubri district from the rivers, wetlands (beels), marshy areas and its surrounding areas to collect the data of diversity, distribution and habitat use types. The studies were done from June, 2010 to June, 2015 using different methods including interviews of people using photo sheets of turtles along with questionnaires, trappings using nets with the help of fishermen and the Visual Encounter surveys (VES) following Crump and Scott (1994). Line transect and Point transect method is also used. Observations were recorded in data sheets along with all relevant information. Vernier calipers was used to measure straight carapace length (CL), Curved carapace length (CL), Straight carapace width (CW) and Body weight (BW) with spring balance for morphological measurements, recognition, natural history; status with coloured illustration of the species was carried out. Identification of the species was done by Das (1991, 1995) and Iskandar (2000).

Transect design

After the preliminary study of the Dhubri district 36 turtle potential sites were selected from riverine and wetland habitat which include river Brahmaputra and its tributaries Champabati, Gourang, Gadadhar, Gangadhar, Tipkai, Sankosh, Silai, Jinjiram and Kalo. The wetlands includes like Dheer Beel, Diplai Beel, Chanda khola Beel and Soreswar beel, Tamranga beel, Dhaloni beel and Hakama beel etc. In the survey area fixed length transact of 1000m

and quadrate 10X 5m^2 were used following Bibby *et al.* (1992).

Data analysis

Statistical data analysis were done using MS excel software and data were represented in tabular form for different parameters.

RESULTS

The study revealed that Dhubri district was very rich in turtle diversity which includes 10 species of turtles. Of this 10 species 6 belongs to Geoemydidae family and 4 belongs to Trionychidae family (Table-1). The details of the turtle species with their conservation status were present in table-1.

During the investigation altogether 75 number of *Melanochelys tricarinata* individual were observed including 29 males 22 females and 28 juveniles in various study sites of Dhubri district. The morphometric measurement of the turtle revealed that the mean carapace length (CL) was 21.40±2.35cm (n=20, range= 14.62-26.00), carapace width (CW) was 17.10±2.25cm (n=20, range= 14.90-22.10), Plastron length (PL) 14.90±2.26cm (n=20, range= 8.30-19.55), body weight (BW) 690.00±225.20g (n=20, range= 420-1090) (table-2). They were mainly seen in the grassland habitat of the riverine Char of Brahmaputra and the wetland like Dheer beel and Diplai beel.

During the survey altogether 34 individual of *Morenia petersi* were observed including 14 males 12 females and 5 juveniles in various study sites of Dhubri district. The morphometric measurement of the turtle revealed that the mean carapace length (CL) was 10.00±1.93cm (n=7, range= 12.00-19.00), carapace width (CW) was 14.60±1.50cm (n=7, range= 13.2-15.00), Plastron length (PL) 11.8±2.35cm (n=7, range= 11.25-14.00), body weight (BW) 403.71±84.62g (n=7, range= 245-500) (table-2). They were mainly recorded from wetland habitat like Dheer beel.

Altogether 92 individual of *Pangshura sylhetensis* were observed including 28 males 34 females and 30 juveniles in various study sites of Dhubri district. The morphometric measurement of the turtle revealed that the mean carapace length (CL) was 6.13±0.97cm (n=16, range= 4.20-7.30), carapace width (CW) was 4.46±0.54cm (n=16, range= 3.40-5.40), Plastron length (PL) 3.90±0.64cm (n=16, range= 2.70-4.9), body weight (BW) 28.93±2.08g (n=16, range= 25.20-32.40) (table-2). They were mainly seen in the grassland habitat of the riverine Char of Brahmaputra and the wetland like Dheer beel and Diplai beel.

During the investigation altogether 229 number of *Pangshura tentoria* individual were observed including 81 males 68 females and 80 juveniles in various study sites of Dhubri district. The morphometric measurement of the turtle revealed that the mean carapace length (CL) was 10.74±1.93cm (n=30, range= 3.82-19.20), carapace width (CW) was 8.30±1.52cm (n=30, range= 3.39-15.30), Plastron length (PL) 9.96±2.01cm (n=30, range= 3.46-18.30), body weight (BW) 97.37±18.59g (n=30, range= 26.00-180.00) (table-2).

Table-1: Freshwater turtles species recorded from Dhubri, district, Assam with their conservation status during the study period (2010-2015)

Sl No.	**Family**	**Common Name**	**Taxon**	IUCN Status	Indian WPA Status
1	*Geoemydidae*	Assam roofed turtle	*Pangshura sylhetensis*	EN	**Not included** in any Schedule (I-VI)
2	*Geoemydidae*	Indian tent turtle	*Pangshura tentoria*	LR/LC	-do-
3	*Geoemydidae*	Brown roofed turtle	*Pangshura smithii*	LR/NT	-do-
4	*Geoemydidae*	Indian eyed turtle	*Morenia petersi*	VU	-do-
5	*Geoemydidae*	Asian leaf turtle	*Cyclemys species*	LR/nt	-do-
6	*Geoemydidae*	Tricarinate turtle	*Melanochelys tricarinata*	VU	SCH- I
7	Trionychidae	Indian flap-shelled turtle	*Lissemys punctata andersoni*	LR/LC	-do-
8	Trionychidae	Narrow-headed softshell turtle	*Chitra indica*	EN	-do-
**SCHEDULE I (*(Sections 2, 8,9,11, 40,41, 48,51, 61 & 62)* **					
9	Trionychidae	Indian peacock soft-shell turtle	*Aspideretes hurum*	VU	SCH- I
10	Trionychidae	Gangetic soft-shell turtle	*Aspideretes gangaticus*	VU	SCH-I

Table-2: Morphometric measurements (Mean± Standard deviation) of turtle species observed in the study sites during study period from Dhubri district. (n= Number of observation, CL= Carapace length, CW= Carapace width, PL= Plastron length and BW= Body weight).

SL No.	Species	n	CL (cm)	CW(cm)	PL(cm)	BW(gm)
1	*Pangshura sylhetensis*	16	6.13±0.97 (4.20-7.30)	4.46±0.54 (3.40-5.40)	3.9± 0.64 (2.70-4.90)	28.93±2.08 (25.20-32.40)
2	*Pangshura tentoria*	30	10.74 ± 1.93 (3.82-19.20)	8.30 ±1.52 (3.39- 15.30)	9.96 ±2.01 (3.46-18.30)	97.37±18.59 (26.00-180.00)
3	*Pangshura smithii*	10	11.83±1.14 (9.01-16.30)	7.93±0.50 (6.59-10.10)	11.69±1.08 (8.95-14.9)	128.83±12.80 (98.00-178.00)
4	*Pangshura tecta*	25	12.42±1.44 (9.10-16.30)	7.91±1.55 (4.90-12.30)	11.77±1.37 (8.92-15.40)	81.8±10.39 (57.00-110.00)
5	*Morenia petersi*	7	10±2.75 (12.00-19.00)	14.6±1.50 (13.20-15.00)	11.8±2.35 (10.10-14.00)	403.71±84.62 (245.00-500.00)
6	*Melonochelys tricarinata*	20	21.40±2.35 (14.62-26.00)	17.10±2.25 (14.90-22.10)	14.90±2.26 (8.30-19.55)	690.00±225.20 (420.00-1090.00)
7	*Aspederates gangeticus*	24	56.67 ± 5.29 (47.00-67.5)	41.5± 4.33 (33.50-49.5)	43.97± 4.14 (36.6-51.30)	22300± 4508.00 (14000-30200)
8	*Aspederates hurum*	15	15.12±6.43 (10.60-24.20)	17.50±9.10 (12.00-26.05)	20.40±12.95 (11.60-32.70)	809.65±264.67 (700.00-2640.00)
9	*Lissemys punctata andersoni*	36	17.02 ± 2.55 (9.20-27.10)	13.47± 2.73 (5.30-25.00)	13.71± 2.37 (7.10-23.90)	714.14± 146.57 (360.00-1430.00)
10	*Chitra indica*	10	58.56±4.66 (48.25—62.00)	49.20±5.62 (42.10-49.00)	40.00±6.75 (35.00-43.30)	28010.00±5520.00 (5000.00-30000.00)

Altogether 140 individual of *Pangshura tecta* were observed including 53 males 35 females and 52 juveniles in different study sites of Dhubri district. The morphometric measurement of the turtle revealed that the mean carapace length (CL) was 12.42±1.44cm (n=25, range= 9.10-16.30), carapace width (CW) was 7.91±1.55cm (n=25, range= 4.90-12.30), Plastron length (PL) 11.77±1.37cm (n=25, range= 8.92-15.40), body weight (BW) 81.8±10.39g (n=25, range= 57.00-110.00) (table-2).

During the study period altogether 50 individual of *Pangshura smithi* were observed including 22 males 19 females and 9 juveniles in various study sites of Dhubri district. The morphometric measurement of the turtle revealed that the mean carapace length (CL) was 11.83±1.14cm (n=10, range= 9.10-16.30), carapace width (CW) was 7.93±0.50cm (n=10, range= 6.59-10.10), Plastron length (PL) 11.69±1.08cm (n=10, range= 8.95-14.90), body weight (BW) 128.83±12.80g (n=10, range= 98.00-178.00) (table-2).

Altogether 231 individual of *Lissemys punctata andersoni* were observed including 86 males 70 females and 75 juveniles in various study sites of Dhubri district. The morphometric measurement of the turtle revealed that the mean carapace length (CL) was 17.02±2.55cm (n=36, range= 9.20-27.10), carapace width (CW) was 13.47±2.37cm (n=36, range= 5.30-25.00), Plastron length (PL) 13.71±2.37cm (n=36, range= 7.10-23.90), body weight (BW) 714.14±146.57g (n=36, range= 360.00-1430.00) (table-2).

During the study period altogether 140 individual of *Aspederates gangeticus* were observed including 50 males 57 females and 33 juveniles in various study sites of Dhubri district. The morphometric measurement of the turtle revealed that the mean carapace length (CL) was 56.67±5.29cm (n=24, range= 47.00-67.50), carapace width (CW) was 41.50±4.33cm (n=24, range= 33.50-49.50), Plastron length (PL) 43.97±4.14cm (n=24, range= 36.60-51.30), body weight (BW) 22300.00±4508.00g (n=24, range= 14000.00-30200.00) (table-2).

During the investigation altogether 32 individual of *Aspederates hurum* were observed including 18 males 9 females and 5 juveniles in various study sites of Dhubri district. The morphometric measurement of the turtle revealed that the mean carapace length (CL) was 15.12±6.43cm (n=15, range= 10.60-24.20), carapace width (CW) was 17.50±9.10cm (n=15, range= 12.00-26.05), Plastron length (PL) 20.40±12.95cm (n=15, range= 11.60-32.70), body weight (BW) 809.65±264.67g (n=15, range= 700.00-2640.00) (table-2).

During the study period altogether 78 individual of *Chitra indica* were observed including 35 males 20 females and 23 juveniles in various study sites of Dhubri district. The morphometric measurement of the

turtle revealed that the mean carapace length (CL) was 58.56±4.66cm (n=10, range= 48.25-62.00), carapace width (CW) was 49.20±5.62cm (n=10, range= 42.10-49.00),

Table-3: Geographical coordinate of the study site of Dhubri district

S.N.	Name of the study Site	GPS Location	
		Latitude	Longitude
1	Jhagrarpar	26°2'25.56"N	89°57'43.73"E
2	Folimari	26°3'4.15"N	89°57'57.02"E
3	Panchpeer Dargah	26°1'22.47"N	89°59'42.26"E
4	Jagmaya Ghat	26°0'22.47"N	89°59'30.60"E
5	Panchu Ghat	26°0'39.25"N	89°59'40.88"E
6	Chagalchara	26°1'1.71"N	89°56'48.11"E
7	Dhubrichar	26°1'51.69"N	89°58'36.57"E
8	Snan Ghat	26°12'59.59"N	90°8'13.61"E
9	Joypur	26°13'32.30"N	90°8'16.70"E
10	Kuarpar	26°15'49.07"N	90°7'53.83"E
11	Silgara	26°15'27.31"N	90°16'23.13"E
12	Florican garden	26°14'58.15"N	90°16'27.45"E
13	Hatipota	26°13'34.93"N	90°14'40.62"E
14	Killahara	26°10'32.77"N	90°15'41.95"E
15	Cholakura	26°7'56.64"N	90°13'50.87"E
16	Raichander Char	26°7'14.61"N	90°11'35.53"E
17	Sonamukh	26°13'13.87"N	90°17'31.34"E
18	Chandardinga	26°11'25.75"N	90°21'43.94"E
19	Sreegram	26°11'57.63"N	90°22'44.19"E
20	Hajua Char	26°6'57.54"N	90°23'16.63"E
21	Upartary	26°14'52.69"N	90°15'4.29"E
22	Kutipara	26°14'53.58"N	90°15'14.98"E
23	Dighalgaon	26°14'55.86"N	90°15'16.00"E
24	Gaurang Bridge	26°15'1.82"N	90°16'25.36"E
25	Kaimari Char	26°16'45.18"N	89°51'16.10"E
26	Bhangaduli	26°13'30.08"N	89°48'29.40"E
27	Pubmaicha Char	26°10'39.16"N	89°48'38.82"E
28	Kheluapara	26°16'51.41"N	90°28'24.39"E
29	Kushum beel	26°23'45.46"N	90°6'23.92"E
30	Chakrashila Pt-I	26°17'32.55"N	90°22'30.75"E
31	Chakrashila Pt-II	26°17'4.71"N	90°22'31.67"E
32	Alurbhui	26°16'28.41"N	90°22'40.79"E
33	Chagalkhuti	26°16'33.26"N	90°23'46.76"E
34	Phulbari -I	25°53'16.07"N	90°0'33.98"E
35	Phulbari -II	25°56'14.49"N	90°2'27.30"E
36	Patakata	25°50'43.98"N	89°57'57.02"E

Plastron length (PL) 40.00±6.75cm (n=10, range= 35.00-43.30), body weight (BW) 28010±5520.00g (n=10, range= 5000.00-300000.00) (table-2).

DISCUSSION

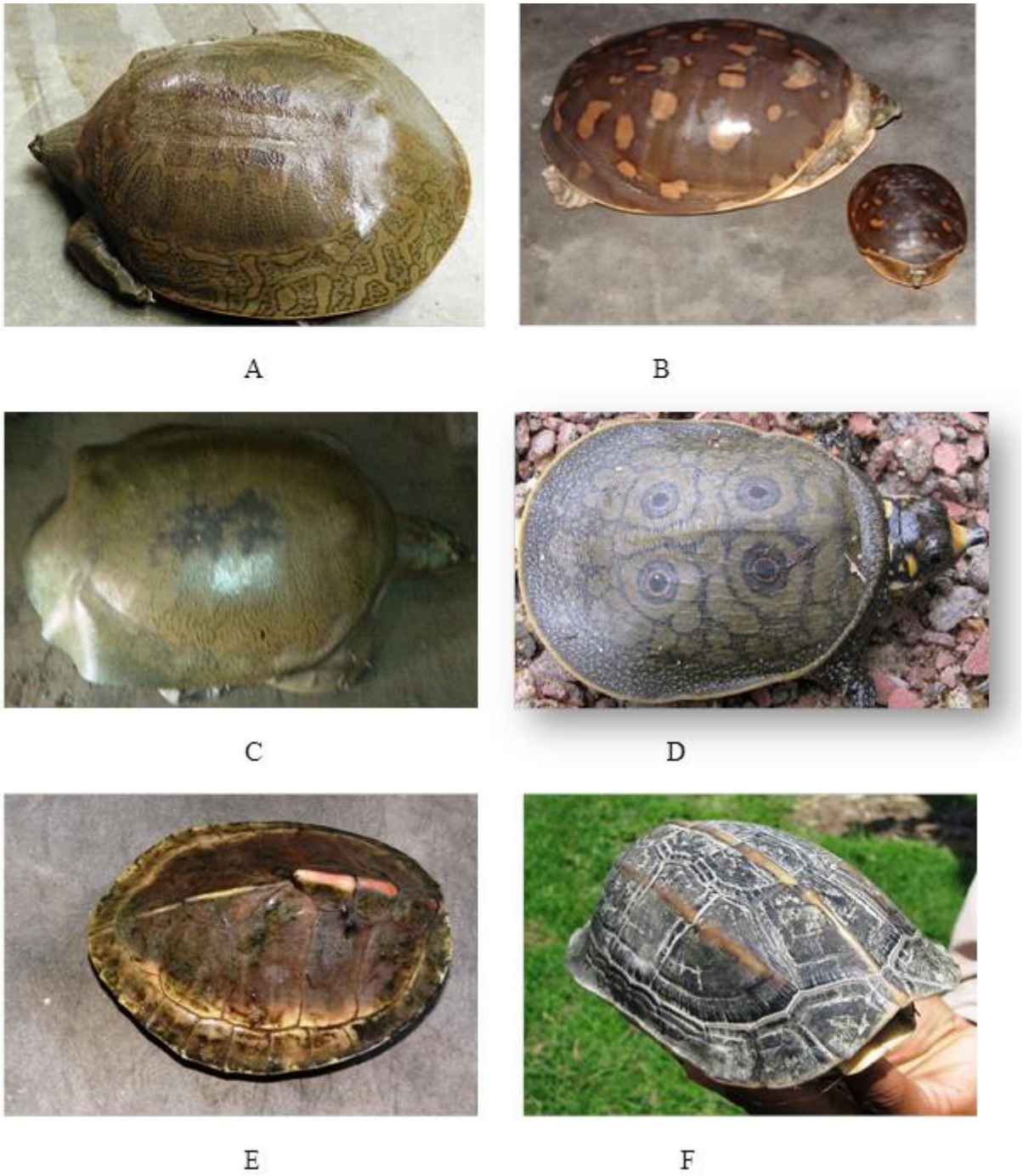
During the survey, six species of Geoemydidae (*Pangshura sylhetensis, Pangshura tentoria, Pangshura smithii, Pangshura tecta, Morenia petersi,* and *Melanochelys tricarinata*) and four species of Trionychidae (*Lissemys punctata andersoni, Chitra indica, Aspideretes hurum* and *Aspideretes gangaticus*) were recorded from 36 sites of Dhubri district Assam which indicates high turtle diversity.

Melanochelys tricarinata were reported from the grassland habitat of the study site including Chakrashila part- I and Chakrashila part- II, Dhubrichar, Raichander Char and Chandardinga. Similar observation of *Melanochelys tricarinata* from Assam was reported by Bhupathy *et al.* (1992) from Kaziranga and Orang National park, Das (1995) and Sengupta *et al*. (1995, 1997) also reported from Kamrup district. The species was also reported by Basumatary and Sharma (2013) from Kaziranga. Another species *Morenia petersi* were also recorded from Dhir beel, Diplai beel and Sareshwar beel of the study site. Sengupta *et al.* (1998) earlier reported this species from Pabitora Wildlife sanctuary. The species was also reported by Basumatary and Sharma (2013) from Kaziranga National Park and Deka and Saikia (2015) from Orang National Park.

The present study revealed that the endangered species *Pungshura sylhetensis* was occurred in the river Brahmaputra and its tributaries of Dhubri district. Choudhury (1993) reported that the species occur both in flood plain and fast moving stream with sandy bottom. During the present study the species were encountered in the Chanderdinga, Snanghat and Hajua Char of Brahmaputra river.The species was also reported by Sharma (1988) from Manas National Park, Lahkar (2000) from Kaziranga National park and Sharma *et al.* (2009) reported its distribution and conservation status in Assam. Deka and Saikia (2015) also reported the same species from Orang National Park, Assam. *Pangshura smithii* recorded from Panchughat, Raichander char and Sreegram of the study sites. The previous record of the species was from Saikhowaghat (Choudhury, 1994), Kamrup district (Sengupta *et al.*, 1998), Brahmaputra and its tributaries (Rashid and Khan, 2000), Kaziranga National Park (Basumatary and Sharma, 2013) and Orang National Park (Deka and Saikia, 2015).

The *Pungshura tecta* species were reported from both wetland and riverine habitat of the study site. According to Smith (1931) the species is widely distributed from Ganga to Brahmaputra basin. The species was also reported by Basumatary and Sharma (2013) from Kaziranga National Park. *Pungshura tentoria* species were reported in large number from the study sites of Dhubri district. Choudhury (1993, 1994)

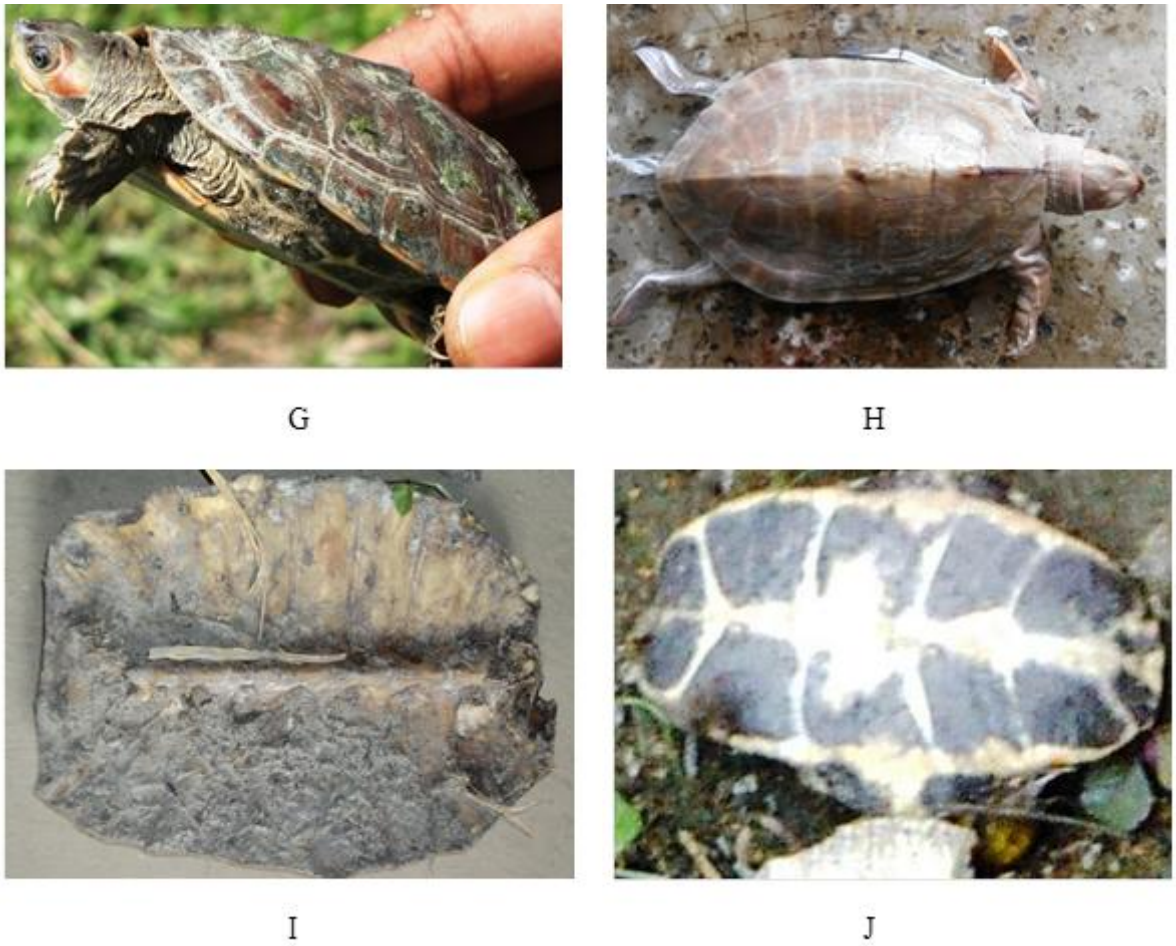
Figure-2. Some of the species recorded from the study site of Dhurbri district.
A-Chitra indica, B-Lissemys punctate andersoni, C-Aspederates gangeticus, D-Aspederates hurum, E-Pangshura tentoria and F-Melanochelys tricarinata



reported this species from Brahmaputra river at Sibsagar, Guijan and Saikhowaghat and from different national parks by Basumatary and Sharma (2013) and Deka and Saikia (2015).

Aspederates gangeticus reorded from the study areas of Dhubri district was one of the highly hunted freshwater turtle species due to its large size and high demand in the market. The present study encountered this species in Panchughat, Dhubrichar, Chandardinga, Hajua Char, Phulbari and Patkata. *Aspederates gangeticus* were repoted by Choudhury (1995) from Dibru-Saikhowa Biosphere Reserve and by Sengupata *et al.* (1997) from Kamrup district. The species were also reported from different localities of Assam such as Kaziranga, Orang and Nameri National Park by Bhupathy *et al.* (1997). The vulnerable turtle species *Aspederates hurum* was reported from the wetland habitat of the study site. Like *Aspederates gangeticus* this species also suffers from the flesh trade. This species also killed by the fisherman and hunter using

Figure-3. Some of the species recorded from the study site of Dhurbri district.
G-Pangshura sylhetrensis and H-Pangshura tecta and I and J were the carapaces of different turtle species recorded from the study sites



various trap like different types of fishing net and baited hook. Therefore their numbers are decline at an alarming speed. The species was earlier reported by Bhupathy *et al.* (1992) and Basumatary and Sharma (2013) from Kaziranga National Park, from Sibsagar, Sonapur, Guijanghat, Nazira and Bokakhat (Das, 1995) and from Orang National Park by Deka and Saikia (2015).

In the present study the endangered species *Chitra indica* were recorded from various study site of the Brahmaputra River and its tributaries of Dhubri district such as Phulbari, Pubmaicha, Gaurang, Chandardinga and Raichander Char. They were killed by fisherman and hunter using line hook due to their high demand for meet. Choudhury (1992) reported this species from Dibru-Saikhowa Biosphere reserve, Das and Gupta (2011) from Barak river and from different national park by Basumatary and Sharma (2013) and Deka and Saikia (2015). Another freshwater turtle species *Lissemys punctata andersoni*, highly hunted by fisherman and turtle hunter were reported from the study areas. They were killed mainly during April-May in their late hibernating period. Once this species was abundantly occurred in the district but due to its over exploitation for meet and illegal trade their number declined at an alarming speed. Due to their high adaptability they were found in various habitats as wetland, marshy land, agriculture field and slow moving rivers. *Lissemys punctata andersoni* was previously reported by Das (1990), Bhupathy *et al.* (1992), Sengupta *et al.* (2000), Das and Gupta (2011), Basumatary and Sharma (2013) and Deka and Saikia (2015).

In the present investigation presence of two families and 10 species of turtle has indicated the high diversity of freshwater turtle in the district. But the turtle populations of the Dhubri district are under tremendous threat due to overexploitation, environmental pollution and habitat destruction. Hunting of the animals and destruction of eggs are the major threats for turtle. Females are generally killed due to their large size resulting in sex ratio imbalance, which is another major threat for turtle. The turtle trade is now a days done through the riverine routes as the riverine routes are free from any kind of checking. The turtle like pungshura species were also killed by entangling fishing net and other fishing gears. Therefore, strong and sustainable step must be initiated for the

conservation of the turtle species of Dhubri district and following step should be taken as early as possible-

- Attempts should be made to conserve the physical ecology as well as the natural flow of the river.
- There should be a strong implementation of conservation laws and acts to make free from illegal poaching of turtle and their eggs collection and protection of habitats.
- Enthusiastic participation of the local communities must be entertained. The people who earn their livelihood from it should be provided alternative ways by the government.

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Conflict of Interests

Authors declare that there is no conflict of interests regarding the publication of this paper.

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