

Reproductive Behavior of Crocodile in Kotmi Sonar of Janjgir Champa (C.G.): A Review Paper

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Abstract: Crocodile has been categorized as a vulnerable species in the Red List of IUCN and is placed under schedule 1 of the Wild Life Protection Act, 1972. To protect Crocodiles a Crocodile Conservation Park has been established by The Govt. of Chhattisgarh in Munda pond of Kotmi Sonar, District Janjgir - Champa, (C. G.) India. The physicochemical conditions of Munda pond provide an optimal conditions for, growth and vital activities for this species, *Crocodylus palustris*. The population of *Crocodylus palustris* is gradually increasing up to 378. The establishment of incubation centre, artificial hatchery and other technical facilities helps in the increasing population of *Crocodylus palustris*. The potentialities of Crocodile Park showed explored from point of view of knowledge, research activities and ecotourism as well.

Keywords: Conservation, Eco tourism, vulnerable species.

1. Introduction

The Marsh Crocodile, Mugger or *Crocodylus palustris* is a common and widespread crocodylian species in India [Vyas, 2012]. *Crocodylus palustris* is ecto and heterothermic, seasonal breeder, gonochoric, dioecious, hole-nesting and oviparous species [Jacobson, 1999; Da Silva and Lenin, 2010]. The population of *Crocodylus palustris* is reportedly declining [Whitaker and Andrews, 2003; Oza, 1975]. The population is reportedly declining due to illegal hunting for skin and indigenous medical purpose, habitat destruction. Lack of appropriate 'rescue and release' protocols and man made causes are another causes for shrinking population of *Crocodylus palustris* [Vyas, 2012; Da Silva and Lenin. 2010; Whitaker and Whitaker, 1984; Joshi et al., 2011; Vyas and Vyas, 2002; Vyas, 2010]. Their global population is tentatively estimated as 5400 to 7100 non-hatching [Da Silva and Lenin, 2010]. To protect and conserve this endangered species, it has been categorised as a vulnerable species in the Red List of IUCN and Red List of threatened Reptilian species. It is placed under schedule 1 of Wild Life Protection Act, 1972 [Joshi et al., 2011; Choudhury and Chowdhury, 1986; Bharos and Kanoje, 2007]. To provide a higher degree of protection to *Crocodylus palustris*, a Crocodile Conservation Park is established in Munda pond at Kotmi Sonar of Janjgir-Champa District of Chhattisgarh, India [Fig. no. 1]. Crocodiles were observed here during basking from 08.00 A.M. to 05.00 P.M. The presence of 16 - 17 transverse rows of dorsal shield, usually two median rows are considerably broader [Fig. no. 2], 4 - 6 longitudinal series of scutes, broadest snout with 19 upper teeth and an externally visible cone shaped 4th tooth on each side are the characteristics of *Crocodylus palustris*.

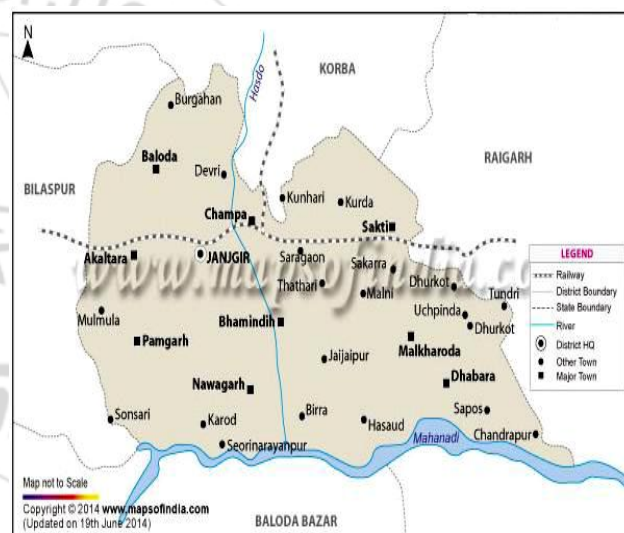


Figure 1: Showing Study area (*Crocodylus palustris*) Kotmi Sonar, Dist. Janjgir Champa, Chhattisgarh



Figure 2

The present study was conducted in Kotmi Sonar. The Kotmi Sonar is an ancient village of District Janjgir - Champa (Chhattisgarh) India. It lies at 22° 01' 44.8" north latitude and 82° 21' 13.1" east longitude [Bharos and Kanoje, 2007]. It is situated in Mumbai Howrah railway line between

Bilaspur and Champa junctions of Chhattisgarh, India [Fig. no. 1]. The Munda pond is spread on 85 acre area. The terrain of Kotmi Sonar is almost plain with gentle slope. The Kotmi Sonar is situated in 620 meters above M.S.L. The underlying rocks are granite, schist and limestone [Bharos and Kanoje, 2007]. In the present study, four study sites [at four corners] were pointed out.



Figure 3: Area of Kotmi Sonar (Mundapond)

Our qualitative analysis focuses primarily on the behaviours of adults during three phases of reproduction :-

- 1) Defense of Territory and courtship,
- 2) Nesting and Incubation,
- 3) Hatching and Post hatching.

2. Material And Method

The visual ground survey method was used to identify the morphological characteristics and study of behavioral responses. 'Direct Counting Method' and 'Capture and Release Technique' were used to estimate the population of Crocodiles. The indirect evidences such as foot prints, sign of body impressions were also studied. Useful Tools is Technical, camera, interview, visual observation.

Statistical analysis

$$\text{Mean } X = \frac{\sum x}{n}$$

$$\text{Standard or S.D. or } \sigma = \frac{\sqrt{\sum b^2}}{n-1}$$

$$\text{Standard Error. } SE = \frac{SD}{\sqrt{n}}$$

$$\text{Student's test } t = \frac{x_1 - x_2}{\sqrt{SE1^2 - SE2^2}}$$

3. Observation

Population estimated by "Direct counting method" and "Capture and release technique". Visual observation, interaction with local people and Departmental field staff were made for the behavioural study of *Crocodylus palustris*.

Table 1: Population Survey of *Crocodylus Palustris* (Male+Female+Juveniles) in Kotmi Sonar in Janjgir-Champa (C.G.)

Sample Site	Male	Female	Juveniles	Total
A	06	09	50	65
B	06	07	35	48
C	08	11	30	49
D	05	08	45	58
Total	25	35	160	220

Table 2: Observation periods divided into Pre-mating, Mating and Post-mating period based on the timing of the natural mating season

Activities	Observation Period	Method	Behaviour
Pre-mating	1 January 2016 – 31 January 2016	Direct	Nesting (after 1 month)
Mating	1st February 2016 – 30 April 2016	Direct	Egg laying (After 55-75 days)
Post-mating	1st May to August 2016	Direct	Hatching-Behaviour

Table 3: Sound, Signaling, Courtship, Mating, Nesting, Incubation, Pre-hatching and Post-hatching of *Crocodylus palustris*

Sno.	Reproductive Behaviour			
	Activities	Month	Weeks	Observation
1	Pre-mating	January 2016	1 st	Normal activities
			2 nd	Normal activities
			3 rd	Normal activities
			4 th	Some crocodiles between fighting
2	Mating	February 2016	1 st	Normal activities Showing by crocodiles
			2 nd	Pair were showing copulation
			3 rd	Normal activities
			4 th	Normal activities
		March 2016	1 st	Pair were showing copulation
			2 nd	Normal activities
			3 rd	Normal activities
			4 th	Normal activities
		April 2016	1 st	Eggs were laying by female
			2 nd	Normal activities
			3 rd	Eggs were laying by female
			4 th	Normal activities
3	Post-mating	July 2016	1 st	Normal activities
			2 nd	1 female showing Hatching activities
			3 rd	Normal activities
			4 th	Some juveniles into water
		August 2016	1 st	Normal activities
			2 nd	Juveniles were come out from eggs.
			3 rd	Normal activities
			4 th	Some juveniles into water

The primary advantage of egg freezing is that your eggs are able to be safely stored at a time when they are most healthy and viable. This means that when you are ready to start a family, the eggs are in the best possible health resulting in the highest chance of successful for fertilization and a healthy pregnancy.

At New Hope Fertility Center, we use the state of the art flash freezing method of vitrification as a part of the storage process. During vitrification:

- The harvested eggs are evaluated for health and quality
- Healthy eggs are prepared for storage by first removing water and adding a cryoprotectant, this helps to reduce the likelihood of damage by ice crystals
- The eggs are flash frozen and reduce in temperature from 98.6 degrees to the storage temperature in an instant. This is in stark contrast to traditional freezing methods where the eggs are gradually cooled. The instantaneous freeze also significantly reduces the chance of damage by ice crystals
- The frozen eggs are safely stored in our facility until you are ready for them.
- When you are ready for the eggs, the process is reversed and the thawed eggs are ready for fertilization, either by your partner's or donor sperm.

There are few disadvantages to storing your eggs. During the cycle where the eggs are harvested, patients undergo a traditional IVF protocol. This protocol uses fertility medication to promote the maturation of multiple eggs. Our goal is to have the maximum number of eggs harvested and stored for future use. There are known side effects with fertility medication including the risk of ovarian hyper stimulation syndrome or OHSS

4. Conclusion

C.P. *Crocodylus palustris* is a Red listed species so conservation is required our nearest place village Kotmi sonar Distt. Janjgir-Champa(C.G.) a big conservation area for crocodile species (*Crocodylus Palustris*). This place soil, water and environmental condition is very perfect for reproduction by *Crocodylus palustris*. Their number increase in this place juveniles and adult growth is well and reproduction condition is well. Female is healthy and strange and their breeding states is very well.

Crocodylus palustris number and population very important for biodiversity and nature and other crocodilians. So save crocodiles you know crocodiles threaten species, so their conservation is very important. Crocodile very important, animal for every think Ex-food biodiversity, medical purpus, ecosystem, food chain, food wed, for fashion, for goods and this is very different another species.

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