

# Mugger Crocodile (*Crocodylus palustris*) study in Iran

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**Abstract:** Small population of Mugger crocodiles distribute in southeastern part of Iran, in Sistan & Baluchestan province. The area is known as the western most global range of the species. The main characteristic of the population is that it has been divided to several sub-populations as well as being scattered in the area. The crocodiles with a number of about 200-300 (Mobaraki 2000) occupy vast range of water bodies, (Mobaraki 2003). Their noteworthy habitats are along 3 main rivers: Kaju- Sarbaz and Bahukalat. Egg laying takes place in mid may and eggs hatch in late July (Mobaraki 2002). The mean size of the eggs in 2 nests were 8 and 4 cm in length and width respectively, and 95 grams in weight (Mobaraki 1998). The mean size for the hatchlings were 30.22 cm length and 87.35 grams of body weight (Mobaraki and et al 2006). Crocodiles use any available resources as food like fish, birds, insects, dogs and even villager's livestock. The most important behavior of Mugger is burrowing (Mobaraki 1999) as well as movement between water bodies. Fortunately there is not any hunting on crocodiles and local people respect them. The main part of crocodile habitats has been designated as protected area.

**Distribution of the Mugger crocodile populations:** The Mugger is a medium to large crocodile (max. length ca. 4-5 m) and has the broadest snout of any living member of genus *Crocodylus*. Mugger crocodile also referred as Marsh Crocodile, is principally restricted to Indian sub-continent. Its global range is in Bangladesh, India, Nepal, Pakistan, Sri Lanka and Iran (Figure 1). Southeastern part of Iran, in Sistan & Baluchestan province near Pakistan border, is the western most global range for the Mugger crocodile and the only distribution area for the species in the country. The small but scattered population occupies vast type of fresh water habitats in the area. The main habitats could be classified in two main natural and artificial habitats. The main natural habitats are the small and large ponds along the main rivers, Kaju, Sarbaz and Bahukalat. Most of these ponds have similar characteristics providing suitable habitats for the crocodiles. Generally, crocodiles avoid from shallow and running parts of the rivers and prefer fairly deep and calm parts of the rivers with suitable vegetation and sandy banks. As the other main habitat type, artificial water bodies also play essential support for the crocodile population too. Small and large ponds nearby villages constructed for the rain water storage as well as the dams constructed along the rivers supposed to be important habitats for the crocodiles too. The main part of the crocodile range with an area of 3800 sq km due to its importance as crocodile habitat designated as 'Protected area named 'Gandou' (local name for the crocodiles), more over some parts of the area also have designated as 19th Ramsar site of the country which annually host large numbers of migratory birds (figure 2).

**Main behaviors:** Similar to other crocodiles daily activities are basking, swimming, under water staying and so on. But the most specific and important behavior of Mugger is Burrowing. The burrows are used as refuge to avoid heat during hot hours of day and may be other purposes. The behavior is observed in different conditions and forms that seem to be related to the habitat. They leave the tunnels at night and wander the area to search for food (Mobaraki 1999) (Figures 7). The movement of crocodiles between the habitats is another quite usual recorded behavior in the area. Movement between the habitats seems to be for searching of new habitat. Based on the observations, this behavior seems to be more usual with juvenile crocodiles. But unfortunately this behavior supposed to be as threat for the crocodiles as when they have to cross the roads car strike causes death for them. We have recorded several times killed crocodiles in different life stages in the roads (Mobaraki & Abtin 2007) (Figures 8)



Figure 1: Global range of Mugger Crocodile



Figure 2: Gandou protected area as the main distribution area of Mugger Crocodile in Iran

**Reproduction:** Female crocodiles reach sexual maturity a length of 1.8-2, around 6 years old, in case that this period for the males takes about 10 years (Whitaker 1989). Mugger crocodiles are hole-nesting species. Nesting is in dry season period. Nesting in Iran takes place in April-May (Mobaraki 2006, 2002). The nests are under thick vegetation and close to water. Average number of eggs per clutch has recorded 25-30 (Whitaker 1989). In 3 founded nests during the studies the nests contained 24, 26 and 21 eggs (figure 3). The mean size of the eggs in 2 nests with 24 and 26 eggs were 8 and 4 cm in length and width respectively, and 95 grams in weight (Mobaraki 1998). These sizes for the last one were, 76.87 mm, 48.06 mm and 77.12 gr (figure 4). The incubation period lasts about 50-60 days and hatching time for the eggs is in June-July. The mean size for the 10 hatchlings in three different nests were 30.22 cm length and 87.35 grams of body weight (Mobaraki and et al 2006) (figure 5,6). Construction of trial nests also is usual.



Figures 7: the burrows of mugger crocodile in different conditions (Mobaraki)



Figures 8: movement between the habitats by crossing the roads cause death to crocodiles (Mobaraki)

**Feeding:** Depending on water bodies it seems that crocodiles use any available resources as food. Studying its feeding habits we collected some fecal samples composed of beetle alytra and legs, fish remains and kingfisher or other birds feather. But it seems that they rely mainly on fish. In most habitats the crocodiles have close contact with local people. So crocodiles usually attack the livestock of the local people, providing some problems to them. Some times villager complain about aggressive crocodiles. (Mobaraki 1999) (Figure 9)



Figure 9: Fish seems to be the main food resource for the Mugger crocodiles in the area (Mobaraki)

**Conservation and population status:** Mugger crocodile has listed as "vulnerable" in IUCN Redlist and habitat destruction is the main threatening factor for this species. Natural threats specially drought and Flooding are the main threats for the crocodiles specially during the nesting season and hatching time. There was a prolonged drought for more than 6 years causing many problems for the crocodile population. There are different reports about the number of crocodiles, 50-100 (Tuck 1975, 118 (Kami 1994), 200-300 (Mobaraki 2000) but in the last census program in Feb 2006 in which about the %80 of the area was covered, 150 crocodiles directly counted. Crocodiles are listed as the "Endangered Species" of the country and legally protected and there is a fine of US\$3200 for any killed one. Fortunately there is high potential for the conservation of crocodiles in Iran as the local people respect them as cultural and social point of view and never hunt or harm them.

## References

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Figure 5: Hatchlings of Mugger crocodile (Abtin)



Figure 6: Mugger nest with hatched eggs