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Kanha National Park (KNP) is situated about 160km southeast of Jabalpur in Madhya Pradesh. It is one of the most important tiger reserves of India and is situated in prime Sal forest well known for its rich diversity of endemic mammals and birds. Since its establishment in 1973, the faunal diversity of Kanha Tiger Reserve (KTR) has been surveyed by wildlife scientists and naturalists. A perusal of published literature shows that so far the focus has been more on the biology of large mammals, birds and the management aspects in KNP. However, some other taxa such as snakes have not yet been fully documented from the reserve. Sanyal & Sur (1995) have compiled a list of invertebrate as well as vertebrate fauna of KNP but include only nine snake species. Hence, a list of snakes in Kanha based upon primary as well as secondary literature is provided here along with notes to add to the present knowledge.

The observations were made between September 2006 and June 2007. During this period, the tourism zone of KNP and reserved forests near Khatiya and Mocha villages were regularly surveyed.

Snakes were identified based on Smith (1943) and Whitaker & Captain (2004). In addition to this, published literature was reviewed.

The study area is KNP and villages in the surrounding area. Moulton & Hulsey (1999) have reported four principle vegetation types in KNP: moist deciduous forest, dry deciduous forest, valley meadow and plateau meadow. Shorea robusta (Sal) is the dominant species in the forest and grasslands are interspersed with thick tree cover in and around the national park.

A list of 22 species belonging to 20 genera and five families has been compiled. Colubridae has the largest number of species in Kanha area. Notes on the abundance, occurrence and literature sources are provided.

**Typhlopidae**

1. *Ramphotyphlops braminus* (Daudin, 1803)

   **Brahminy Worm Snake**

   **Note:** Observed in Khatiya area in a termite mound dug by local people. Also seen during the day on Kisli Road (June 2007) after the first monsoon showers.

   **Literature:** Sanyal & Sur (1995)

2. *Grypotyphlops acutus* (Duméril & Bibron, 1844)

   **Beaked Worm Snake**

   **Note:** Found on forest path from Mocha to Khatiya in October 2006.

**Pythonidae**

3. *Python molurus molurus* (Linnaeus, 1758)

   **Indian Rock Python**

   **Image 1. Python molurus molurus Indian Rock Python**

   **Note:** Observed in Khatiya area in a termite mound dug by local people. Also seen during the day on Kisli Road (June 2007) after the first monsoon showers.

   **Literature:** Sanyal & Sur (1995)
Note: Commonly observed in the tourism zone and forest areas around Mocha and Khatiya. Large specimen seen was around 3.8m (12.5ft) in Mukki range in March (2007). Juveniles were often observed in the surrounding RF areas during April 2007. In December 2006, seven jackals hunted and fed on a 2.3m (7.5ft) python in Phuta Tal area in the evening.


Colubridae

4. Coelognathus radiatus (Boie, 1827) Copper-headed Trinket Snake (Image 2)
   Note: Seen in Mocha close to the stream just after the beginning of the monsoons. Villagers report that it climbs trees and feeds on birds.

5. Coelognathus helena (Daudin, 1803) Common Trinket Snake

6. Coelognathus helena monticollaris (Schulz, 1992) Montane Trinket Snake
   Note: Roadkill on Sijhora Road close to Koila bhatta in February 2007

7. Ptyas mucosa mucosa (Linnaeus. 1758) Indian Rat Snake
   Note: Very common, found throughout the park and surrounding areas. Often killed in villages. An eight feet long specimen was seen on Kanha main Road close to Chamhar Ghat.

8. Argyrogena fasciolata (Shaw, 1802) Banded Racer
   Note: Observed basking on a log near Schaller hide Road.

9. Dendrelaphis tristis (Daudin, 1803) Common Bronzeback Tree Snake

10. Lycodon striatus (Shaw, 1802) Barred Wolf Snake
    Note: Observed on a mango tree in Kanha Ghat and also in Mocha in March 2007.

11. Lycodon aulicus (Linnaeus, 1758) Common Wolf Snake (Image 3)
    Note: Common throughout the area. Killed specimen was observed near Kanha Museum. Several were observed around the Mocha Village in all seasons.

12. Sibynophis sagittarius (Cantor, 1839) Cantor’s Black-headed Snake
    Note: Not seen during the survey period

13. Amphiesma stolatum (Linnaeus, 1758) Striped Keelback
    Note: Commonly seen in national park and surroundings after the first monsoon showers. Several killed on road from Tatri to Khatiya

14. Macropiesthodon plumibicolor (Cantor, 1839) Green Keelback
    Note: Juvenile specimen found killed on a rock near Khatiya Gate, March 2007

15. Xenochrophis piscator (Schneider, 1799) Checkered Keelback
    Note: Common in all streams, rivers, anikuts inside as well as outside KNP.
16. **Boiga forsteni** (Duméril, Bibron & Duméril, 1854) Forsten’s Cat Snake
   **Note:** About 1.1m (3.5ft) individual observed in Mocha Forest on a Sal tree.

17. **Ahaetulla nasuta** (Lacepède, 1789) Common Vine Snake
   **Note:** Found close to viewing point of Bamani Dadar. The brown form was noted close to Chai nalla, Kanha range.

18. **Elachistodon westermanni** Reinhardt, 1863 Indian Egg-eater Snake
   **Literature:** Included based upon Handbook of Kanha National Park by H.S. Panwar (cited in Moulton & Hulsey 1999)

**Elapidae**

19. **Bungarus fasciatus** (Schneider, 1801) Banded Krait
   **Note:** 1.7m (5.5ft) specimen was reported in Mocha Village in July 2007.
   **Reference:** C. Moulton & E.J. Hulsey (pers. comm.), Faiyaz & Eric D’Cunha (pers. comm.)

20. **Bungarus caeruleus** (Schneider, 1801) Common Krait
   **Note:** Most common venomous snake seen in and around the NP between March and July. 1.4m (4.5ft) long specimen was observed. Often killed on roads and by local people.
   **Literature:** Sanyal & Sur (1995), Moulton & Hulsey (1999)

21. **Naja naja** (Linnaeus, 1758) Spectacled Cobra
   **Note:** Occasionally found in and around the NP throughout the year. Often killed by local people.
   **Literature:** Sanyal & Sur (1995), Moulton & Hulsey (1999)

22. **Daboia russelii** (Shaw & Nodder, 1797) Russell’s Viper
   **Note:** Rarely seen

23. **Echis carinatus** (Schneider, 1801) Saw Scaled Viper
   **Note:** Doubtful
   **Literature:** Moulton & Hulsey (1999)

24. **Trimeresurus gramineus** (Shaw, 1802) Bamboo Pit Viper
   **Note:** Observed on bamboo clumps and in tree hole close to Bapsa Behra Road in February 2007

**Discussion**
Kanha National Park covers a large area of well-protected Sal forest in almost natural conditions. The habitat conditions are suitable for many more snake species, which are seen in Madhya Pradesh. However, owing to the lack of comprehensive survey of the entire park area only 22 species are noted so far. It is thus essential to conduct an extensive survey of the national park area to record the diversity of snake species.

Venomous snakes like kraits and cobras are very commonly seen but bites are seldom reported. In spite of this, several venomous as well as non venomous snakes are killed by the local people owing to a lack of awareness. As mentioned in the notes above, road kills are common on the main road to the Khatiya gate and also within the park during the tourist season from October to June end. It is necessary to create awareness amongst tourist
vehicle drivers to avoid road kills and take other measures to minimize them.

References


With varied topography and environmental conditions, Gujarat State harbours a rich and unique diversity of reptiles. Present reptilian fauna composition of Gujarat State contains 114 species of reptiles (Gayen 1999; Vyas 2000a, 2000b, 2007; Vyas et al. 2006; Vyas 2007).

In spite of all this data, some pockets of the protected area have remained unexplored or the intensive efforts to document (reptilian fauna in particular) have been insufficient including areas like Girnar, Balaram-Ambaji, Pania, Mitiyala, Kutch Desert and Shoolpaneshwar Wildlife Sanctuary (SWS). Recent record of a new species of a Ground Dwelling Gecko by Giri et al. (2009) not only shows the significance of state reptilian fauna, but also indicates that the present state fauna has been underestimated and needs more exploration to know the actual reptilian diversity.

The literature reveals that a few herpetologists, e.g., Naik et al. (1995) and Sabnis & Amin (1992) have attempted the study of reptiles at the Shoolpaneshwar Wildlife Sanctuary (Table 1). Also, a few published scientific papers and miscellaneous

### Table 1. List of earlier records of reptilian species from the sanctuary

<table>
<thead>
<tr>
<th>Name of Species</th>
<th>Family</th>
<th>Source</th>
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<tbody>
<tr>
<td>Crocodylidae</td>
<td></td>
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</tr>
<tr>
<td>1. Crocodylus palustris *</td>
<td>Crocodylidae</td>
<td>* - Sabnis &amp; Amin 1992</td>
</tr>
<tr>
<td>2. Chamaeleonidae</td>
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<tr>
<td>3. Chameleoon zealandicus **</td>
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<td>4. Agamidae</td>
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<tr>
<td>5. Calotes calotes **</td>
<td>Agamidae</td>
<td>** - Naik et al. 1993</td>
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<tr>
<td>6. Calotes versicolor *</td>
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<td>7. Calotes rouxi **</td>
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<td>8. Calotes rouxi **</td>
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<td>9. Silana ponticeriana **</td>
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<td>10. Eutropis carinata **</td>
<td>Eutropisidae</td>
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<td>11. Eutropis macularia **</td>
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<td>12. Hemidactylus flaviviridis *</td>
<td>Hemidactylidae</td>
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<td>13. Hemidactylus brookii **</td>
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<td>14. Varanus bengalensis *</td>
<td>Varanidae</td>
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<td>15. Varanus moseleyi *</td>
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<td>16. Varanus moseleyi *</td>
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<tr>
<td>17. Typhlops eligans *</td>
<td>Typhlopidae</td>
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<tr>
<td>18. Ramphotyphlops braminus **</td>
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<td>19. Python molurus *</td>
<td>Boidae</td>
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<td>20. Uropeltis ocellatus **</td>
<td>Uropeltidae</td>
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<tr>
<td>21. Uropeltis ocellatus **</td>
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<td>22. Colubridae</td>
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<td>23. Amphiasma stolata *</td>
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<td>24. P Casey *</td>
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<tr>
<td>25. P Casey *</td>
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<tr>
<td>26. Xenochrophis piscator **</td>
<td>Elapidae</td>
<td></td>
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<tr>
<td>27. Naja naja **</td>
<td>Viperidae</td>
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<tr>
<td>28. Echis carinata **</td>
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</table>

(Source: * - Sabnis & Amin 1992; ** - Naik et al. 1993)
notes mention the records of a few reptilian species from the area, including Burton (1941), Sharma (1982), Naoroji & Monga (1983), Naik et al. (1992) Naik & Vinod (1994) and Vyas (1991, 1998, 2008). But none of them thoroughly or extensively explored the entire sanctuary for reptiles. Therefore this survey was conducted to know the present status of reptilian diversity in and around Shoolpaneshwar Wildlife Sanctuary from January 2007 to December 2008.

**Study Area**

The Shoolpaneshwar Wildlife Sanctuary (SWS) lies on the southern side of Narmada River, located on the western most end of the Satpura mountain ranges. The sanctuary shares a common boundary area on its eastern side with two Indian states: Madhya Pradesh and Maharashtra. The SWS encompasses 607.71km² of deciduous forest and is geographically located in between 21°39’-21°51’N & 73°34’-73°54’E (Fig. 1). According to Champion & Seth (1968) these forests are classified as bio-geographic zone 4 - the semi-arid zone and are considered as 4B Gujarat-Rajwada Biotic Province. This ecosystem represents remnants of semi-evergreen-moist deciduous forest and is further classified into moist teak forest, moist mixed deciduous forest, dry deciduous scrub, dry bamboo brakes and dry tropical riverine forest.

**Habitat:** The SWS is a 'dry mixed deciduous forest', further identified into the following eight important habitats. These identified habitats and particular forest pocket habitats areas were selected for the extensive fieldwork and they were repeatedly explored during the study for measuring the reptilian diversity.

**Wetlands:** Within the sanctuary area, there is no stagnant water wetland, except a few river pools found on the river streams of Narmada and its other tributaries namely: Karjan, Terav, Dev and its small rivulets. There are two manmade water reservoirs Narmada Dam and Karjan Dam situated on the edges of
the sanctuary.

**Riverine forest:** A good number of riverine forests are found on both the sides of the River Terav and rivulets of Narmada (left banks) and Dev River (left banks), in the sanctuary.

**Moist Teak forest:** Very few pockets of moist teak forests are found on Gichad, Waghumar and Chopadi areas. These are surrounding the high hills of Dhaman Mal, Mat Baman and Dev Aanbalh Dungar.

**Moist mixed deciduous forest:** Very small pockets of the habitat are found within the sanctuary, including Gichad, Waghumar, Chopadi, Mal, Samot and Ninoy.

**Dry deciduous forest:** Most of the sanctuary area is covered with dry deciduous forest. There are large areas of dry deciduous forests found surrounding the sanctuary in reserved forests.

**Dry Bamboo brakes:** Very small forest areas of dry bamboo brakes are in the sanctuary and found in Gichad, Chopadi and Waghumar (forest blocks of 233, 237 & 238).

**Agricultural fields:** There are large areas of agricultural fields found within the sanctuary. Most of the agricultural fields are situated surrounded by villages, but some agricultural fields and experimental silvicultural research plots are found in the interior parts of the forest. There are noticeably large areas of the forest illegally encroached by the inhabitants, especially during the monsoon season. Local inhabitants clear out the healthy forest by setting it on fire in the end of summer and prepare large areas for agriculture.

**Degraded disturbed scrub forest:** Large sized degraded and disturbed scrub forest areas are situated on the margin of the sanctuary and are surrounded by agricultural fields within the sanctuary.

**Methods**

The following survey methods were followed and the information was collected in the following manner, (i) relevant literature survey, (ii) field surveys by visual encounter and plot and transect survey and, (iii) recording the species through the indirect evidences like shell, molt and footprints.

In addition, secondary information was gathered from local people of surrounding villages, forest personnel and wildlife enthusiasts about the different species of reptiles by interviewing and showing colour pictures of the species to them.

Entire study area is identified and classified as per available known various major habitats like, wetlands, riverine forest, dry deciduous forest, moist teak forest, moist mixed deciduous forest, dry bamboo brakes, Agricultural fields and Degraded disturbed scrub forest.

Each one of the habitats was identified within the sanctuary area through rapid survey. Then we selected various potential areas from the aspect of availability of reptilian species from the above identified major habitat areas. These selected potential habitats were intensively explored (especially microhabitat) regularly through repeated visits in various seasons.

During the study, all the important species were documented through colour photographs. As and when close examination was required, then animals were caught and released in the same area/habitat after the recording of necessary data.

The status of each species of reptiles (except serpents) was observed in four categories on the basis of total number of each species encountered or sighted during the survey. The category values are: rare (1-5); less common (6-25); common (26-75) and abundant (above 76).

**Results**

During the study I have been able to collect information of a total of 40 species of reptiles (Table 2) belonging to 13 families, including one species of crocodile, two species of turtles, 17 species of lizards and 20 species of snakes (four species of venomous snakes).

**Crocodile**

**Crocodylidae:**

**Mugger Crocodile** *Crocodylus palustris*:

A small population of Mugger or Marsh Crocodile is found in two reservoirs, Narmada Dam and Karjan Dam. These two
man-made water bodies are situated on the edge of the sanctuary. The Narmada Dam is situated on the northern boundary and Karjan Dam is found on the northwestern corner of the sanctuary, both the reservoirs are very large and have submergence areas covering 34867 and 3687 ha (approximately), respectively. During the visits, I did not find any mugger crocodiles in these two water reservoirs. According to the local fishermen, two large crocodiles were found in Mokhadi Village area and five to six big crocodiles were found at Kanji, Khal and Shoolpaneshwar faliya areas. These areas are on the edge of right banks of Narmada Dam. A few published literature indicate that there is only a small population of muggers surviving in both these reservoirs.

Turtles

**Trionychidae:** Indian Soft-shell Turtle *Nilssonia gangetica*: This is a large sized fresh water turtle, having scavenger and predating habits. The species is not recorded in the sanctuary area but it inhabits in Narmada and Karjan Dams. In monsoon season, female turtles use certain river stream area, which is a part of the Sanctuary.

Indian Flap-shell Turtle *Lissemys punctata*: A small population of this species has been recorded in the perennial river pools of Terav, Dev and Narmada (tributary). These river pools are a part of the dam and are disconnected from the main streams of the reservoirs, during the dry season.

**Lizards**

**Gekkonidae:** Brook’s House Gecko *Hemidactylus brookii*: This is a small sized gecko growing about 6-8 cm long. Most common and abundantly found gecko species in the sanctuary. This nocturnal species is found in all the parts of the sanctuary, especially in and around human habitation area.

Yellow-green House Gecko *Hemidactylus flaviviridis*: This is a most common gecko in the area and found in all parts of the forest. This species is also associated with human habitations, and therefore the large sized specimens are inhabitants of most of the forest guest houses and offices which are located in the sanctuary.

Bark Gecko *Hemidactylus leschenaultii*: The Bark Gecko is one of the common geckos in the area and found in all parts of the forest. The gecko prefers dry deciduous and mix deciduous forest. It is recorded in all types of forest habitats, except dry bamboo brakes and human settlement areas.

Termite Gecko *Hemidactylus triedrus*: This nocturnal species is commonly found in degraded disturbed, agricultural and dry deciduous habitat. At night, uncommonly found on the forest floors and road. Small populations of the gecko were found on the way to Fulsar Village.

Unidentified Gecko *(Hemidactylus sp.)* (Image 2): This unidentified gecko species is found in the gardens of the forest guest house of Samot and Dedi yapada. On a close examination, the specimens looked like *Hemidactylus brookii* species.
but it has mix small round and large tubercle on the back. Recently four species of geckos are described from India within the *Hemidactylus brookii* complex. It needs further detailed study for identification, especially DNA fingerprinting.

**Agamidae**

**Indian Garden Lizard** *Calotes versicolor*: This lizard species is commonly found in all types of habitat right from agricultural fields to the dry deciduous and degraded disturbed forest habitats. The large sized specimens are commonly found in and around the gardens of forest guest houses. An unusually white coloured large male was sighted at Waghumar Village, which is very interesting. During the study, I observed a few gravid females foraging on the road under the vehicles’ lights in between Mojada and Sagai villages. Such foraging is very unusual for such a diurnal species and that too in a gravid condition.

Fan-throated Lizard *Sitana ponticeriana* (Image 3): This is a small terrestrial species. This is one of the most common lizards from the Agamidae family and it is found in all types of habitats of the entire sanctuary. It can be differentiated from the other agamas due to its four toes in hind limbs, whereas others have five toes.

**Rock Agama** *Psammophilus blanfordanus* (Image 4): Apparently, it looks like a common garden lizard but it can be differentiated as it has dorso-ventrally compressed body and lack of mid dorsa crest scales. This is one of the abundantly found commonest lizards in the area. The species prefers most types of habitat, except human habitations. Usually, found on big boulders. Therefore its common English name is ‘rock agama’. But it is observed that the lizard has arboreal habits and is found on large tree trunks.

**Chamaeleonidae**

**Indian Chameleon** *Chamaeleo zeylanicus*: During the study very few specimens were observed crossing the road at Sagai, Dabka and near Mojada Village areas. This lizard has special type of adaptive ability and camouflage with surrounding; therefore its presence is not noticeable. It is recorded in riverine, dry deciduous and moist deciduous forest habitats of the sanctuary. Locals refer to it as a poisonous lizard and therefore they kill it out
of fear. In local language it is called "nag tod".

**Scincidae**

Lined Supple Skink *Lygosoma lineata*: This is a small and thin supple skink with five to six brownish-golden lines on its body. This is one of the endemic diurnal skinks from India. Its subterranean life style, habits and habitat are entirely special, and they contribute to its rarity.

A few specimens were found at Nenoi and Samot villages. Two young ones were found at Samot, under large boulders in open scrublands which were converted into agricultural fields during the monsoons. I found one juvenile specimen of the species, under tree buttresses at Nenoi. The tree buttresses were covered with a layer of thick decayed leaf litter. Along with *L. lineata*, I observed four other members of skinks including *Lygosoma albopunctata*, *Eutropis allapallensis*, *E. carinata* and *E. macularia*. All these five skinks were found on the same location within about 3x3 m size area and sharing the same microhabitat.

Spotted Supple Skink *Lygosoma punctatus*: This is one of the diurnal skinks. During the survey it was found in Chopdi, Waghumar, Nenoi and Fulsar forest blocks. It is active in noon and is found under leaf litter, rocks, boulders and decayed wooden logs. A gravid female with three eggs was found under rocks in the month of March at Waghumar forest area. It indicates that pre-summer is the breeding season.

**Lacertidae**

Snake Eye Lacerta (*Ophisops* sp.) (Image 5): This is small sized about 4-8 cm long lacerta. This diurnal terrestrial lizard is found in many parts of the sanctuary. This species is found in dry deciduous, agricultural and degraded scrub forests. Further detailed study is required to confirm its identity.

**Varanidae**

Bengal Monitor *Varanus*
bengalensis: A sub-adult specimen was observed near the Gora range at the northern boundary of the sanctuary. It may have come from the near agricultural fields. The species’ status determined at the sanctuary is likely to be uncertain.

Snakes

During the study, most of the snakes were recorded by accidents or found road killed. There were no special efforts made to search this species due to the time constraint and objective of the study. Totally, 20 species of snakes were recorded in the study, including four species of deadly venomous snakes.

Typhlopidae

Brahminy Worm Snake Ramphotyphlops braminus: This is small worm type snake species found in many parts of world. During the study a small 8cm long live specimen was found beneath the tree logs, in wet pockets of a forest nursery at Waghumar Village.

Boidae

Common Sand Boa Gongylodis conicus: This is a fossorial terrestrial snake species. During the survey, three sub-adult specimens were found, a 62 (57+5) cm long snake was found at noon basking on the road on way to Waghumar. A second specimen was found on 03 May 2008 on the road at Mojada, killed under a vehicle. The third specimen was found near Samot Village on 25 January 2009, a road kill.

Red Sand Boa Eryx johnii: This is a fossorial terrestrial snake species and is usually found in agricultural fields. On 31 May 2005, a sub-adult 45cm long boa was found near Pipalod, crossing the road.

Indian Rock Python Python molurus: During the study, no python was observed or reported in the Sanctuary area. But this does not lead to the fact that this species does not inhabit the sanctuary. The large area of riverine habitat and present forest habitat indicates that the species inhabits the sanctuary.

In third week of August 2007, a 2.5m long python was released in the interior parts of the Sagai Forest by Rajpipala Office, State Forest Department (SFD). The python was rescued from Rajpipala City. Also, in the end of September 2008, a 3.5m long Indian Rock Python was released by the SFD, which was later rescued from Gopalpur town, Rajpipala.

Colubridae

Banded Racer Argyrotena fasciolatus: On 23 February 2008, a meter-long live snake was found under a large boulder at Dodava faliya of Samot Village.

Striped Keelback Amphiesma stolatum: During the study two specimens were recorded at Mojada and Fulsar villages. A 71.5cm long road killed snake was found near Mojada Village. It might have been crushed by some speedy vehicle at night. And a live 58cm (svl: 43+tl:15) specimen was found near Fulsar, crossing the road.

Forstein’s Cat Snake Boiga
forsteni: This is a nocturnal arboreal cat snake. In the first week of August 2007, a 1m live specimen was rescued from a village hut of Mojada, by one of our team members Mr. Irsad Theba.

Indian Cat Snake *Boiga trigonatus* (Image 6): This is a common nocturnal arboreal snake species. During the study a few live specimens were recorded from various types of forest habitats at Sagai, Samot, Fulsar, Mojada, including human settlement areas.

Bronze-back Tree Snake *Dendrelaphis tristis* (Image 7): This is an arboreal diurnal snake species and is usually found on high canopy trees. On 31 May 2008, a live 1.2m (snout to vent length 83.5 + 39.5 tail length) snake was found on the forest floor under dry leaf litter at Chopadi forest area. It might have crawled down on the forest floor due to the scorching heat.

Indian Trinket Snake *Coelognathus helena*: This is a beautiful non venomous snake. A live 1m long snake was caught from the forest road, during a night drive from Dediypada to Fulsar.

Common Wolf Snake *Lycodon aulicus*: This is a nocturnal species, usually found in and around the human vicinity. An adult snake was found on 12 October 2007 on the way to Zarvani Village.

Green Keel-back Water Snake *Macropisthodon plumbicolor*: On 22 August 2008, a young one about 22cm long snake was found at Moti Singlot, during the study.

Banded Kukri Snake *Oligodon arnensis*: On 25 August 2008, an adult measuring 37cm was found near Kokati Faliya, Mojada, which indicates species inhabitation in the area.

Streaked Kukri Snake *Oligodon taeniolatus*: On 11 October 2008, a road killed 30cm long snake was found on our way to Kevadiya Colony to Zarwani Village.

Rat Snake *Ptyas mucosus*: This is a large sized diurnal territorial snake species. On 12 October 2007, a 2m long snake was observed on a tree on the way to Zarvani Village. The snake was very active in search of prey. On 01 March 2009, a 1m long dead rat snake was found near the Pipalod Village. It might have been killed by villagers out of fear due to its apparent similarity with cobra.

Checkered Keel-back Water Snake *Xenochrophis piscator*: This is an aquatic species found in many areas of the sanctuary. This is the most common snake species in the area. It is found in all types of water logging areas, including walls and paddy fields.

**Elapidae**

Common Indian Krait *Bungarus caeruleus*: This is a nocturnal venomous snake species. During the study two fresh killed adult snakes were found on 24 August 2007 and 05 July 2008, at Sagai and Mojada, respectively. Both snakes were found as road kills.

Spectacled Cobra *Naja naja*: This is the most venomous snake species active usually in dawn and dusk. Prominently found around the human settlements and agricultural fields. On 13 October 2007, a large sized 2m cobra was found killed at Bhilvasi forest block.
**Viperidae**

Indian Russell’s Viper *Daboia russelii*: This is one of the most venomous, nocturnal terrestrial snake species. It grows up to 2m in length. During the study no specimen was found, but was recorded by indirect evidences like skin molts. The skin molt was found at two locations, near Sailendra Sina van kedi and at the Chopdi forest area.

Indian Saw-scaled Viper *Echis carinatus*: This is a small sized venomous, nocturnal terrestrial snake species. During the study no specimen was found but was recorded by indirect evidence of skin molts. An intact skin molt was found near an agricultural field of Mal only.

According to the evolutionary adaptation of each species of reptiles, they inhabit in different habitats. During the study we observed 19 species of terrestrial reptiles followed by 13 species of arboreal and four species of fossorial and aquatic reptiles each. The status of reptilian fauna of the area is intermediate (in comparison to other PAs of Gujarat), and individual status of each species is mentioned in Table 2.

**Some notable records**

In this study, a species of amphibian and four species of reptiles are first time records for the sanctuary, these are; Termite Hill Gecko *Hemidactylus triedrus*, Rock Agama *Psammophilus blanfordianus*, Lined Supple Skink *Lygosoma lineata* and Allapalli Grass Skink *Eutropis allapallensis*.

Termite Gecko *Hemidactylus triedrus* is recorded for the first time from this forest, earlier this species was recorded from various protected areas of Gujarat. The reports of the species recorded from proximal areas in southern Gujarat are from Purna-Dangs and in north are from Jambughoda Wildlife Sanctuary. This present record of the gecko is notable.

Rock Agama *Psammophilus blanfordianus* is also a first time record from the sanctuary area and a third locality record for the state. Earlier, the species was reported from Ratanmahal Wildlife Sanctuary and Jambughoda Wildlife Sanctuary (Vyas 2000 & 2006).

Lined Supple Skink *Lygosoma lineata* is a first record from the sanctuary, earlier the species was reported from the right banks of Narmada, Kevadiya Colony by Naik & Vinod (1994) as the first record from the state. Present records from agricultural field of Samot and dry deciduous forest of Nenoi area of the sanctuary is south (left banks) to Narmada River.

Allapalli Grass Skink *Eutropis allapallensis* is an important skink. According to CAMP Report it is considered as Endangered (B1, 2c) species (Molur & Walker 1998). Earlier the species was first time recorded from the Vansda National Park (Vyas 2004). This species is found abundantly in the entire forest trek of the sanctuary and is most noteworthy.

**Summary and Conclusion**

The result of the systematic study of reptilian diversity of Shoolpaneshwar Wildlife Sanctuary indicates that there are 40 species of reptiles, belonging to 13 inhabitant families, including one species of crocodile, two species of turtles, 17 species of lizards and 20 species of snakes. This shows the diversity and richness of the sanctuary.

The reptilian diversity is represented by 12 numbers of colubrid species followed by skinks and geckos each represented by five species, agamids and boids each represented by three species. Families Trionychidae, Elapidae, Viperidae and Lacertidae are represented by two species each. And rest of the three families (Crocodylidae, Chameleonidae, Varanidae) are represented by one species each.

Sabnis & Amin (1992) and Naik et al. (1995) recorded two species of lizards (*Calotes calotes* and *Calotes rouxi*) and a species of snake (*Uropeltis ocellatus*) inhabiting the area. This claim needs further verification.

The records of three unidentified lizard’ species from the area in this study not only shows an urgent
need for a systematic survey on the reptilian fauna but a need for the assessment of actual diversity of amphibians and reptiles inhabiting the area. It also emphasizes the scientific approach towards the collection of specimens for further detailed study on molecular systematics, including tissues and DNA fingerprints.

This result shows the availability of various and complex habitat structures in the sanctuary. Presence of such types of habitats shows all the possibilities of habitation of higher numbers of snakes and lizards species.

References


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In India it is a traditional practice to keep turtles in drinking water wells to eat organisms harmful to human beings and make the water safe for drinking. Also the most commonly used disinfectant for purification of water in India is chlorine in the form of bleaching powder as it is cheap and has strong oxidizing properties (Arceivala & Asolekar 2007). In rural areas bleaching powder is used as a disinfectant without measuring the actual chlorine requirement of the water. The general rule is to add enough bleaching powder so as to give the water a distinct odour and taste of chlorine. This sometimes leaves a high amount of residual chlorine and creates health hazards especially to aquatic animals like the turtle. The present paper describes the successful treatment and rehabilitation of an Indian Mud Turtle (*Lissemys punctata*) poisoned with bleaching powder.

A turtle in recumbent condition was presented to the Surgery Department of Orissa Veterinary College by an animal lover. History revealed that the turtle had been rescued by him from a local fisherman the previous night and kept in his house well. The next morning he observed that the turtle was floating on the surface of the water without showing any movement.

On physical examination of the turtle it was observed that the skin, the scute, the carapace and the plastron were softened and discoloured (Image 1). Burns, blisters (Images 2, 3, 4) and congestion marks (Image 5) were observed on the entire body. Decreased sensation was felt on the scute. The mucous membrane of the eye, mouth and cloaca were congested. The temperature was 21°C and respiration rate was 2/min. The body weight was measured to be 2.5kg. Further investigation revealed that the well had been chlorinated with bleaching powder (33% available chlorine) the previous morning. The turtle showed normal skeletal architecture under IITV (Image intensifier TV) examination (Image 6). The turtle was immediately transferred to a normal saline solution. Resuscitation was tried by pumping its hind limbs in and out keeping it lying on its plastron with its head pointed slightly downward. The legs were used to push against the lungs to expel the poisonous water from the lungs and to assist in respiration. Injection

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**Image 1. Softening and discolouration of the anterior, posterior and lateral carapace**

**Image 2. Blisters and Congestion marks on the right forelimb and neck**
dexamethasone 0.1ml and Injection Neohepatex (Biologicals E. Limited, Azamabad, Hyderabad, A.P., India) 0.1ml were given intramuscularly. Capsule Santevini – ACE (Beta carotene, Vitamin – A, C and E, Selenium and L-Arginine, Novartis India Limited, Maharastra, India) one tenth part of Ceff (Cefalexin, Lupin Ltd., Kaliana, Santacruz(E), Mumbai) 125mg tablet and Silymarin 15mg were administered orally. Evion cream (Tocopherol acetate, Propylene glycol, liquid paraffin, Merck Limited, Usgaon, Ponda, Goa, India) was applied topically on local burns and blisters. The turtle was kept in normal saline for two hours. Then it was kept in 5% dextrose normal saline for a period of two hours. Then again it was transferred to normal saline. This procedure was repeated for 24 hours. In the mean time the free residual chlorine content of the well water was measured and was found to be 1mg/lit. Then from the second day onwards the water was changed every 6hr and gradually the proportion of pond water was increased by 5% every 6hr till it was kept in pure pond water. Initially the turtle was motionless but after 24 hours of treatment the turtle showed movement of its limbs (Image 7). On the 7th day the turtle showed normal behaviour and movement with raising of its head (Image 8). The carapace (Image 9) and plastron (Image 10) were hardened leaving only a central softened portion. Then it was released in the pond water in its natural habitat.

**Discussion and Conclusions:**

Normal saline was preferred in order to avoid any chances of osmosis or reverse osmosis. Chlorine is a respiratory irritant. In concentrations around 1-3 ppm it causes eye and respiratory tract irritation resulting in breathing difficulties as chlorine combines with the moisture of the respiratory tract mucosa and forms weak acids like hypochlorous acid (Chlorine: Effects on Health and The Environment, 3rd Edition, November 1999; Gupta 2002). Injection dexamethasone was given to counteract the shock (Sandhu & Rampal 2006). Injection Neohepatex was given intramuscularly to enhance the detoxifying action of the liver. Capsule Santevini – ACE was given to counteract the oxidative actions of bleaching powder and to assist in regeneration of mucous membrane. Silymarin was administered orally which

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**Image 3. Blisters and softening of the carapace**

**Image 4. Blisters and softening of the limb**

**Image 5. Congested Plastron**

**Image 6. Normal Skeletal architecture under IITV (C-ARM) examination**
acts as an antioxidant and liver protectant. It was kept in 5% dextrose normal saline intermittently in order to provide nourishment. According to WHO for effective disinfection there should be a residual concentration of free chlorine 0.5mg/lit (Park 2005) after at least 30 min contact time at pH<8.0 (Guidelines for drinking water quality, 3rd Edition 2008). At the point of consumption the minimum residual concentration of free chlorine should be 0.2mg/lit (IS:10500, 1992 and Manual on water supply & Treatment, 3rd Edition, May 1999). But even after 30hr as the residual concentration of the free chlorine was 1mg/lit, a high amount of bleaching powder must have been added to the well water which was incompatible with the live of the turtle.

In the present case the turtle was poisoned with higher concentration of chlorine in the well water which resulted in chemical burns, blisters and asphyxiation. Administration of steroids and manual resuscitation helped the turtle to revive from shock. Toxic concentration of chlorine was removed from the body by keeping it in normal saline. Local application of antioxidants and soothing agents and parental administration of antioxidants, antibiotics, liver protectants resulted in complete recovery.

Reference


Reference
Sighting of King Cobra *Ophiophagus hannah* in Arunachal Pradesh, India: a new altitude record for northeastern India

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The King Cobra *Ophiophagus hannah* the world’s largest venomous snake, though not a common snake, has a wide distribution (David & Vogel 1966). It inhabits dense jungle in peninsular and northern India. Its range extends throughout the Western Ghats within the states of Karnataka, Goa, Kerala and Tamil Nadu; throughout the Terai and Bhabar tracts and lower foothills of Uttarakhand, Uttar Pradesh, Bihar, West Bengal and northeastern India (including Arunachal Pradesh) and Andaman Islands. The species exhibits a preference for dense primary forests and mangrove dominant estuaries of Orissa and West Bengal.

It is occasionally found in large tracts of grassland surrounded by dense forest (Smith 1943; Daniel 2002; Whitaker & Captain 2004). In terms of altitudinal distribution, the species is known to inhabit from 150 to 1530 m in Nepal (Sleich & Kästle 2002), sea level to 1800 m in Sumatra (David & Vogel 1996) and has been reported up to 2181 m in Mussoori Hills (Waltner 1975). Smith (1943) mentions its occurrence at altitudes around 1800 m in the Nilgiris and western Himalaya. A nest was recently located near Talla Ramgarh, Nainital District at an altitude of approximately 1398 m and on two separate occasions King Cobra was sighted at 1740 m near Bhowali, Nainital District in the Kumaon Hills (Rasaily et al. 2008). There is a recent record of the species at an altitude 1700 m from Konoma, Nagaland (Das et al. 2008). The highest known altitude record for the species in northeastern India is 1840 m from Yuksam, Sikkim (Basir et al. 2010).

In October 2006, while conducting bird surveys throughout the West Kameng District in western Arunachal Pradesh, a dead juvenile King Cobra c. 21 cm in length was located on the forest track below Chandar towards the 7 km settlement in degraded forest at 2005 m. Though the King Cobra’s range extends usually at lower altitudes, it appears from the spate of recent records that the species is not adverse to surviving at higher altitudes where prey availability and habitat are suitable.

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Participate in the Status Assessments of Reptiles of the Western Ghats

The Wildlife Information Liaison Development (WILD) Society / Zoo Outreach Organisation (ZOO) in collaboration with the IUCN Global Reptile Assessment (GRA) and the South Asian Reptile Network (SARN) is involved in the assessments of all described reptile species of the Western Ghats and peninsular India. The project is funded by the Critical Ecosystem Partnership Fund (CEPF) large grants programme. If you are any one of the following (herpetologist, academic, student, amateur, photographer, forester, educator, etc.) with information on reptiles in this region or in South Asia (of reptiles that occur in the Western Ghats), your inputs and participation are extremely important to get as accurate information as possible for their assessments. The information will be used to derive the status of each species according to the IUCN Red List Categories and Criteria, and will appear on the IUCN Red List of Threatened Species web site. If you are interested in participating, kindly contact Dr. Sanjay Molur <herpinvert@gmail.com> for further information on the project and details on how you can participate.


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